

Tickborne Disease and Prevention in NH

Solid Waste Operator Training
February 7, 2017

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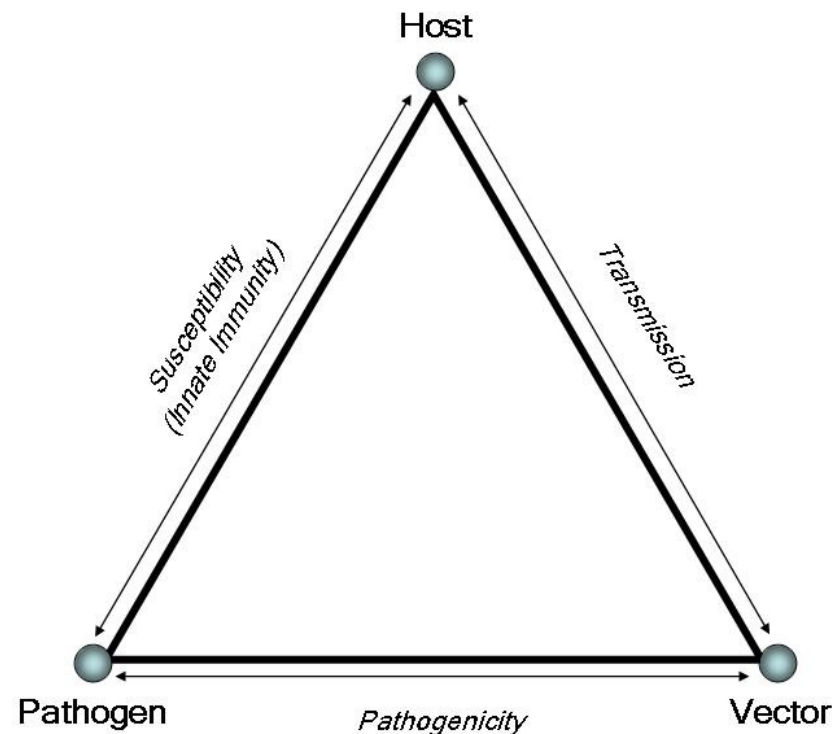
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Tickborne Diseases in NH

- Lyme Disease
- Anaplasmosis
- Babesiosis
- Powassan Virus

Vectorborne Disease

- Three components of vectorborne disease
 - Pathogen
 - Host
 - Vector



https://www.sercc.com/climate_health/

Tickborne Disease Program

NH DHHS Tickborne Disease Activities

- Human case surveillance
- Tick surveillance as funding allows
- Distribution of surveillance data
 - Maps, Data Reports, Incidence by County
- Healthcare provider clinical messaging
 - Annual health alert message with clinical, diagnosis, and treatment information
- Public education and prevention messaging
 - NH DHHS website
 - Annual Press Release
 - Availability of public health staff to respond to public inquiries by phone or email

Ticks in NH

- Common human-biting species in NH
 - American dog tick: *Dermacentor variabilis*
 - Blacklegged tick (deer tick): *Ixodes scapularis***



- Other ticks
 - Winter tick: generally does not bite humans, looks similar to dog tick – moose impacted
 - Lone star tick: may be moving north to NH eventually



CDC – Tickborne Disease Provider Handbook



BLACKLEGGED TICK

Ixodes scapularis

Where found: Widely distributed in the northeastern and upper midwestern United States.

Transmits: Lyme disease, anaplasmosis, babesiosis, and Powassan disease.

Comments: The greatest risk of being bitten exists in the spring, summer and fall. However, adults may be out searching for a host any time winter temperatures are above freezing. Stages most likely to bite humans are nymphs and adult females.



LONE STAR TICK

Amblyomma americanum

Where found: Widely distributed in the southeastern and eastern United States.

Transmits: *Ehrlichia chaffeensis* and *Ehrlichia ewingii* (which cause human ehrlichiosis), tularemia, and STARI.

Comments: A very aggressive tick that bites humans. The adult female is distinguished by a white dot or "lone star" on her back. Lone star tick saliva can be irritating; redness and discomfort at a bite site does not necessarily indicate an infection. The nymph and adult females most frequently bite humans and transmit disease.



AMERICAN DOG TICK

Dermacentor variabilis

Where found: Widely distributed east of the Rocky Mountains. Also occurs in limited areas on the Pacific Coast.

Transmits: Tularemia and Rocky Mountain spotted fever.

Comments: The highest risk of being bitten occurs during spring and summer. Dog ticks are sometimes called wood ticks. Adult females are most likely to bite humans.



Winter tick.
Photo by Dr.
Alan Eaton

CDC – Tickborne Disease Provider Handbook



BROWN DOG TICK

Rhipicephalus sanguineus

Where found: Worldwide.

Transmits: Rocky Mountain spotted fever (in the southwestern U.S. and along the U.S.-Mexico border).

Comments: Dogs are the primary host for the brown dog tick in each of its life stages, but the tick may also bite humans or other mammals.



Steve Jacobs, PSU Entomology

GROUNDHOG TICK

Ixodes cookei

Where found: Throughout the eastern half of the U.S. and Canada.

Transmits: Powassan disease.

Comments: Also called woodchuck ticks. All life stages feed on a variety of warm-blooded animals, including groundhogs, skunks, squirrels, raccoons, foxes, weasels, and occasionally people and domestic animals.



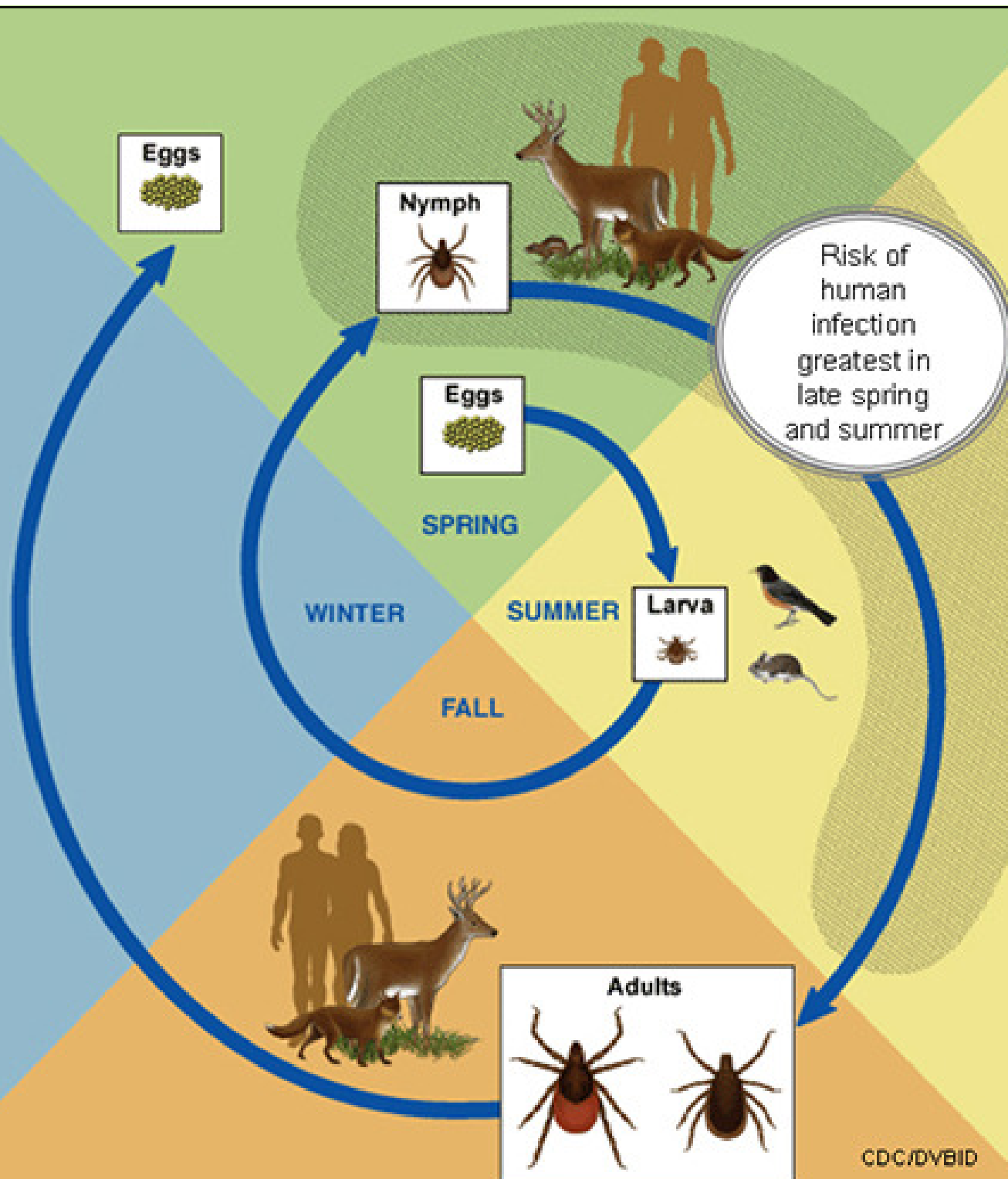
GULF COAST TICK

Amblyomma maculatum

Where found: Coastal areas of the U.S. along the Atlantic coast and the Gulf of Mexico.

Transmits: *Rickettsia parkeri* rickettsiosis, a form of spotted fever.

Comments: Larvae and nymphs feed on birds and small rodents, while adult ticks feed on deer and other wildlife. Adult ticks have been associated with transmission of *R. parkeri* to humans.



CDC/DVBID



Occupations and Activities at Risk

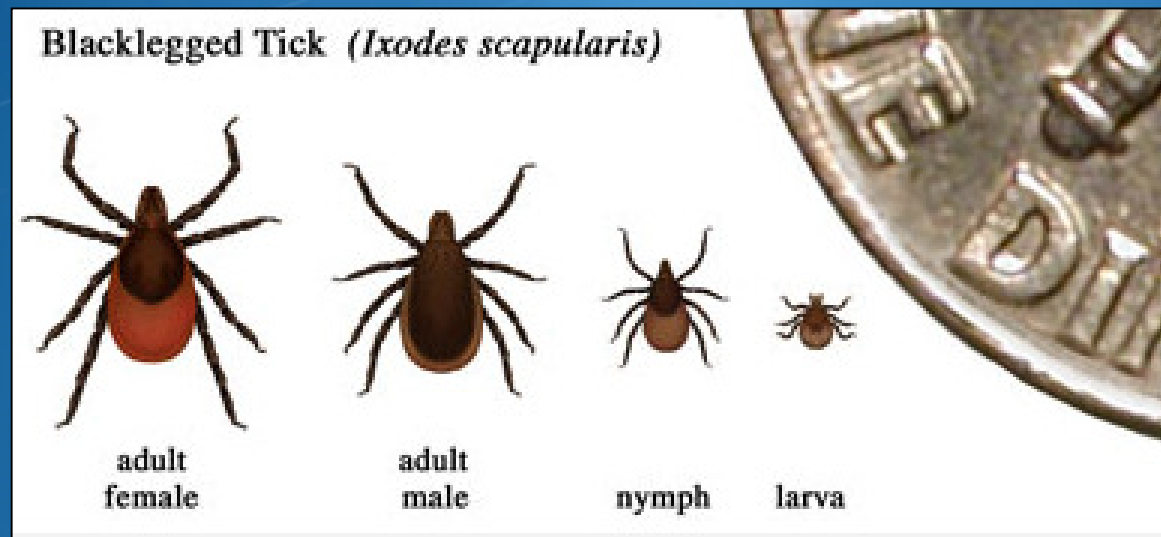
Some of the more common occupations that have a higher risk of tick bites and becoming infected with tickborne diseases include:

- Construction
- Landscaping
- Forestry
- Working with **brush**
- Working with **yard waste**
- Land surveying
- Farming
- Railroad work
- Oil field work
- Utility line work
- Park or wildlife management
- Hunting
- Hiking
- Other outdoor work

Lyme Disease

Lyme Disease Biology

- *Borrelia burgdorferi*
 - Spirochete - motile, corkscrew shaped bacteria
- Transmitted by the bite of an infected blacklegged tick – reinfection possible
- Ticks need to be attached for 24-36 hours before the bacterium can be transmitted
 - Nymphs are very small and can go unnoticed



Symptoms of Lyme Disease

- Early localized disease

- Incubation : 3 to 32 days
- Early localized disease
 - within 1 month of infection
 - Slowly expanding skin lesion (**60-80%**): erythema migrans (bull's eye) **rash**
 - Usually accompanied by **influenza-like illness**: headache, arthralgias, myalgias, fever, lymphadenopathy.



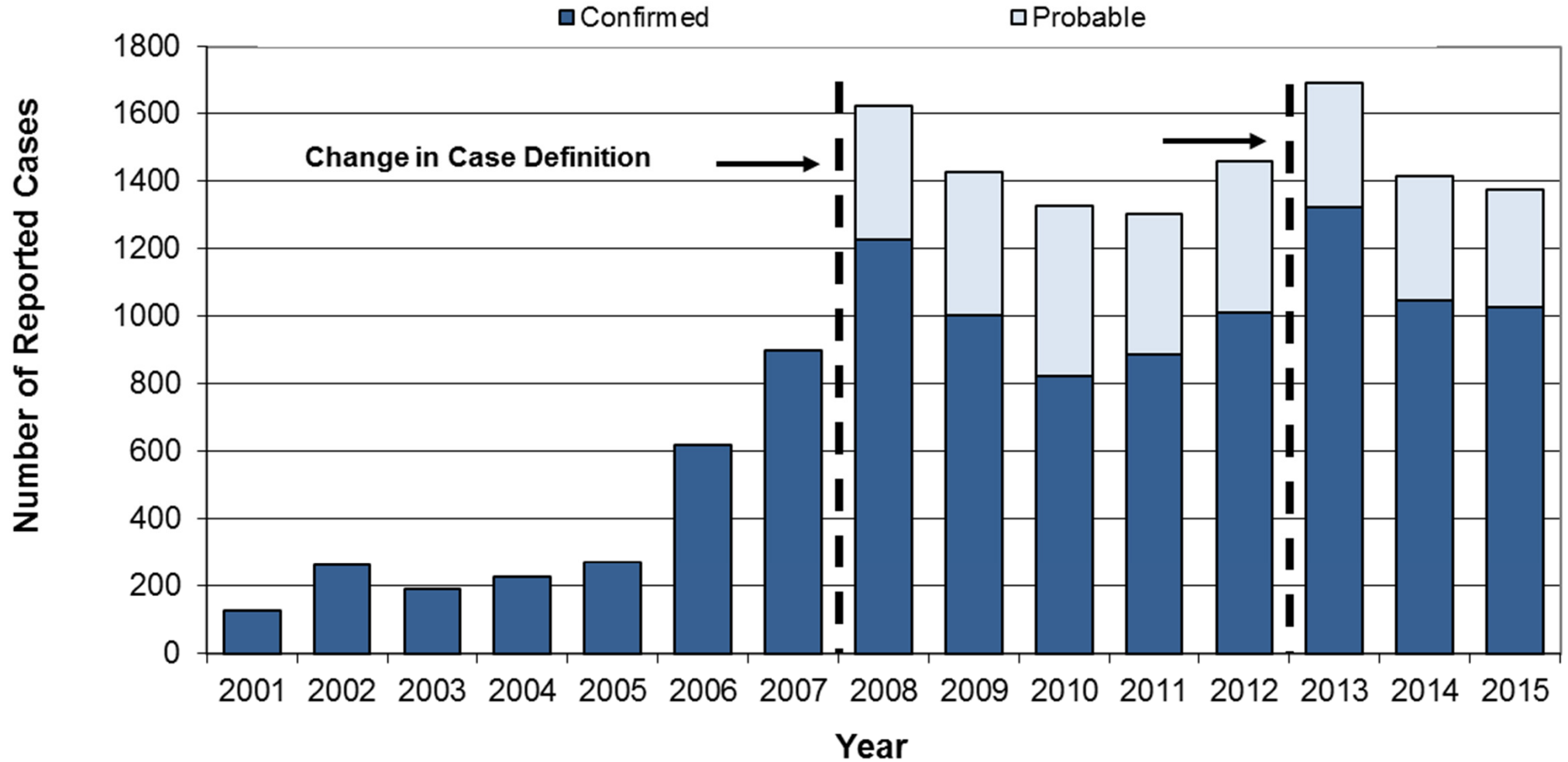
- Early disseminated disease

- Weeks to months after initial infection and can involve skin, joints, heart, CNS
- Neurologic disease in 15% of untreated patients - Neuroborreliosis
- Cardiac disease in 5% of untreated patients
 - Recent publication on Lyme carditis deaths
- Musculoskeletal involvement in 60% of untreated patients

- Late disseminated disease

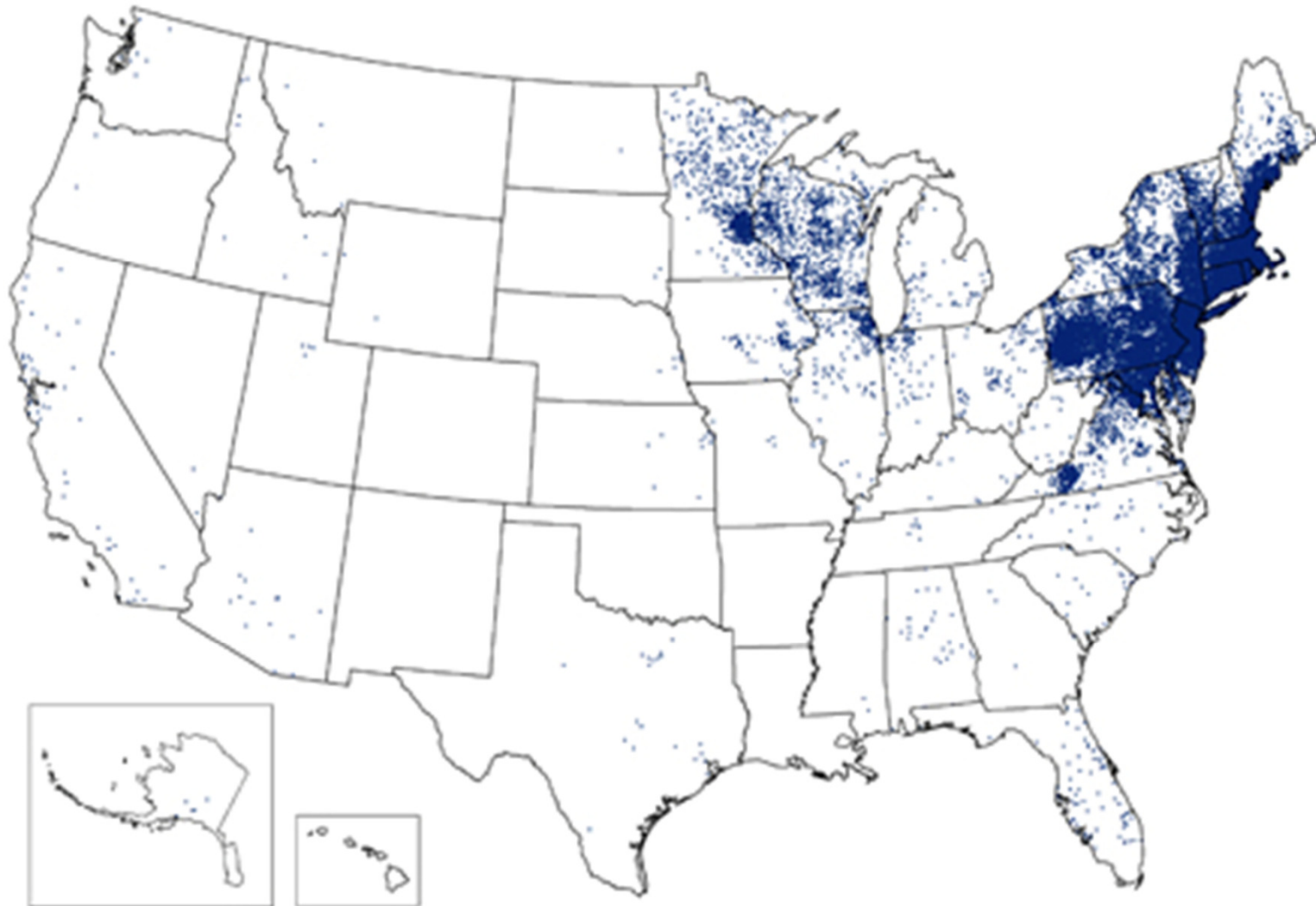
- Months to years after initial infection
- Lyme arthritis – 60% (untreated)
- Neuroborreliosis – 5% (untreated)

Number of Reported Lyme Disease Cases by Year, New Hampshire, 2001-2015



Distribution of Lyme Disease

Reported Cases of Lyme Disease -- United States, 2014



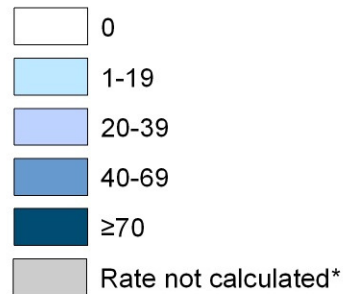
1 dot placed randomly within county of residence for each confirmed case

NH Lyme Maps 2002-2014

New Hampshire Department of Health and Human Services
Division of Public Health Services
Bureau of Communicable Disease Control

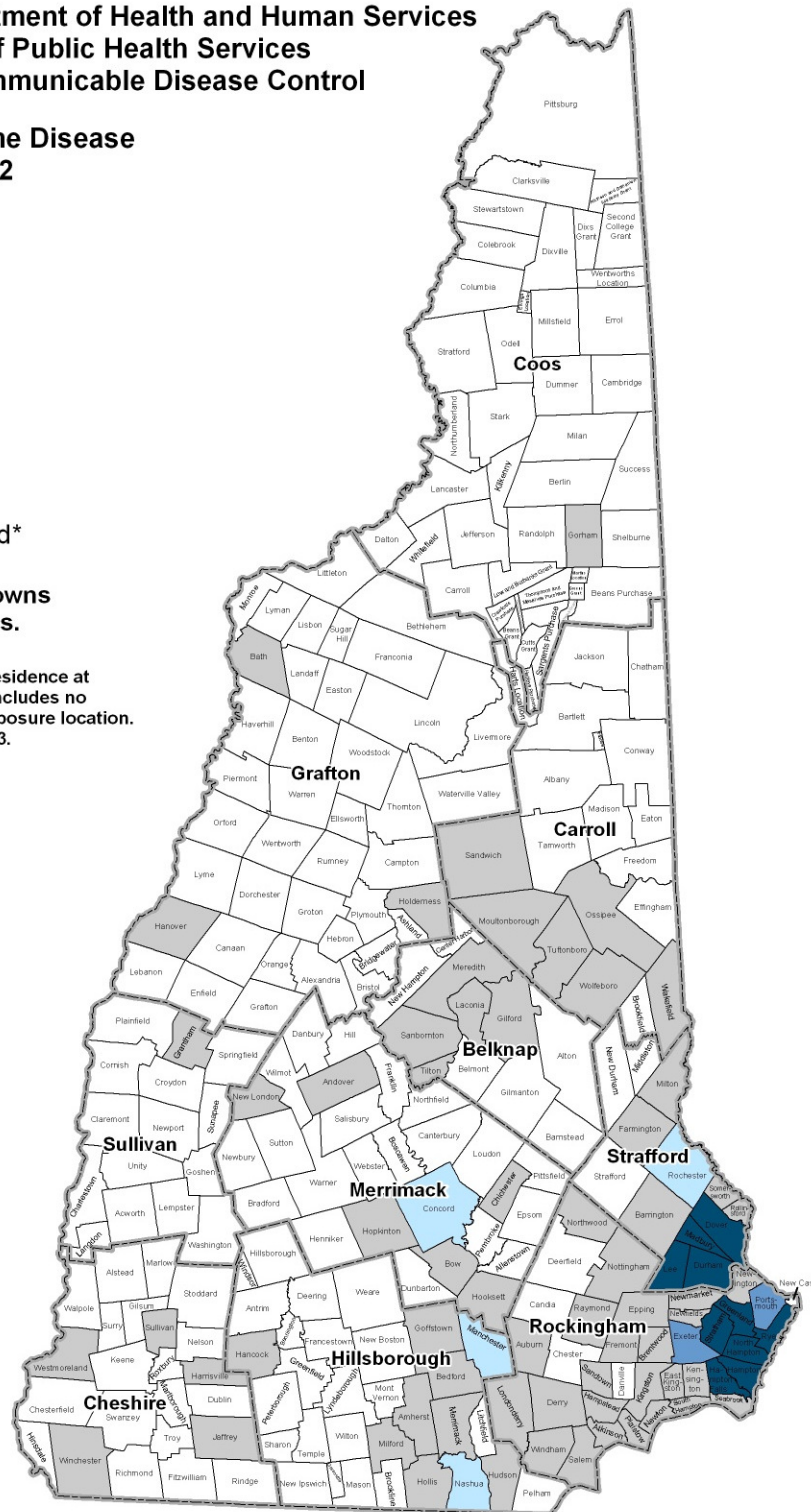
Reported Cases of Lyme Disease
in New Hampshire, 2002

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

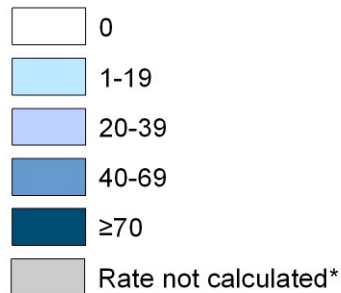
Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of April 1, 2003.



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Division of Public Health Services
Bureau of Communicable Disease Control

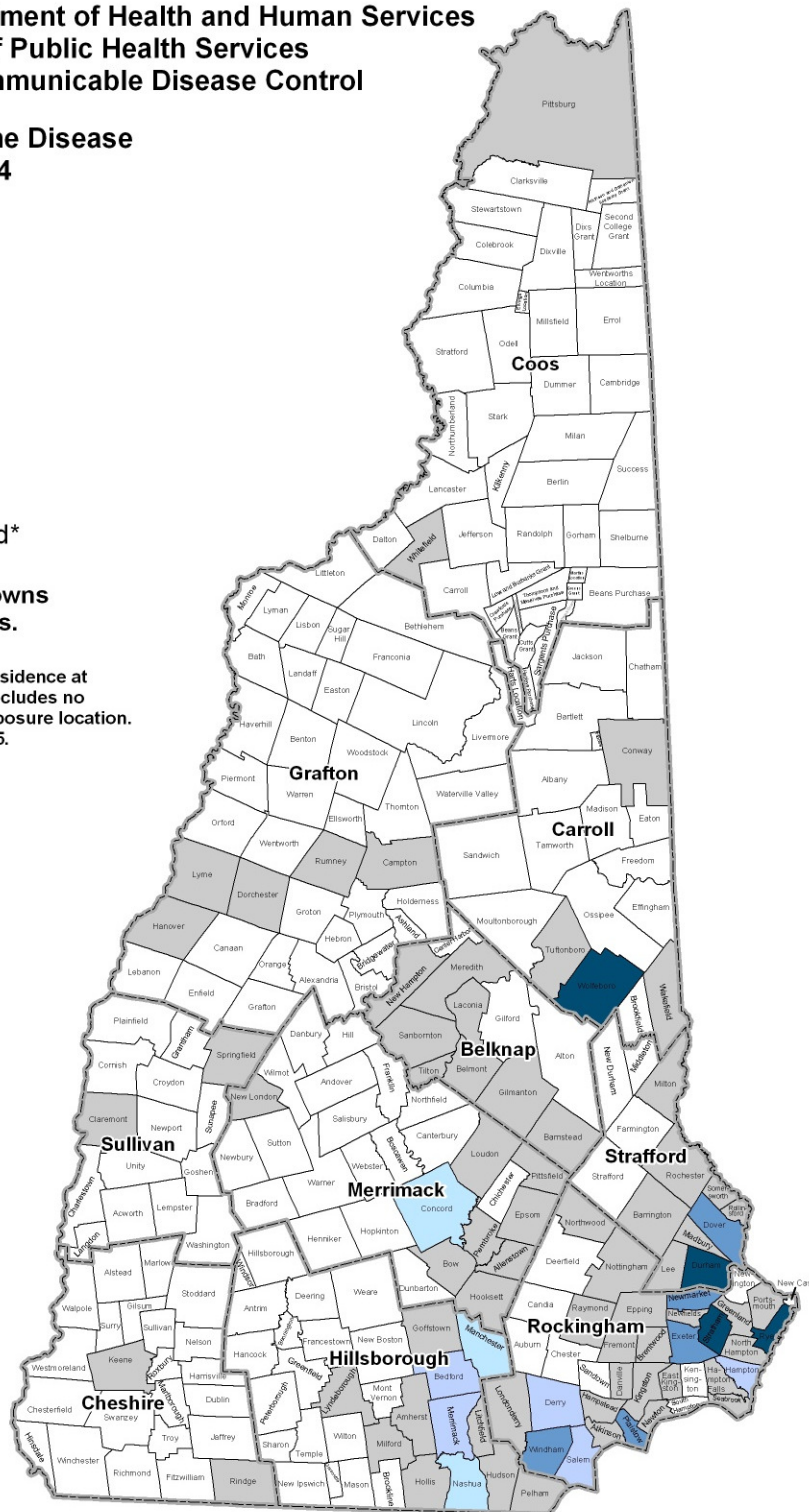
Reported Cases of Lyme Disease
in New Hampshire, 2004

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of April 1, 2005.



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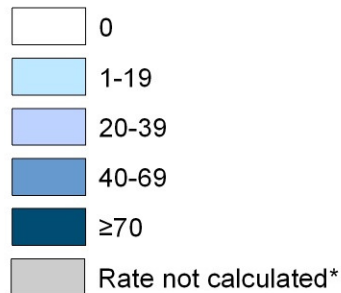
Department of Health & Human Services



New Hampshire Department of Health and Human Services
Division of Public Health Services
Bureau of Communicable Disease Control

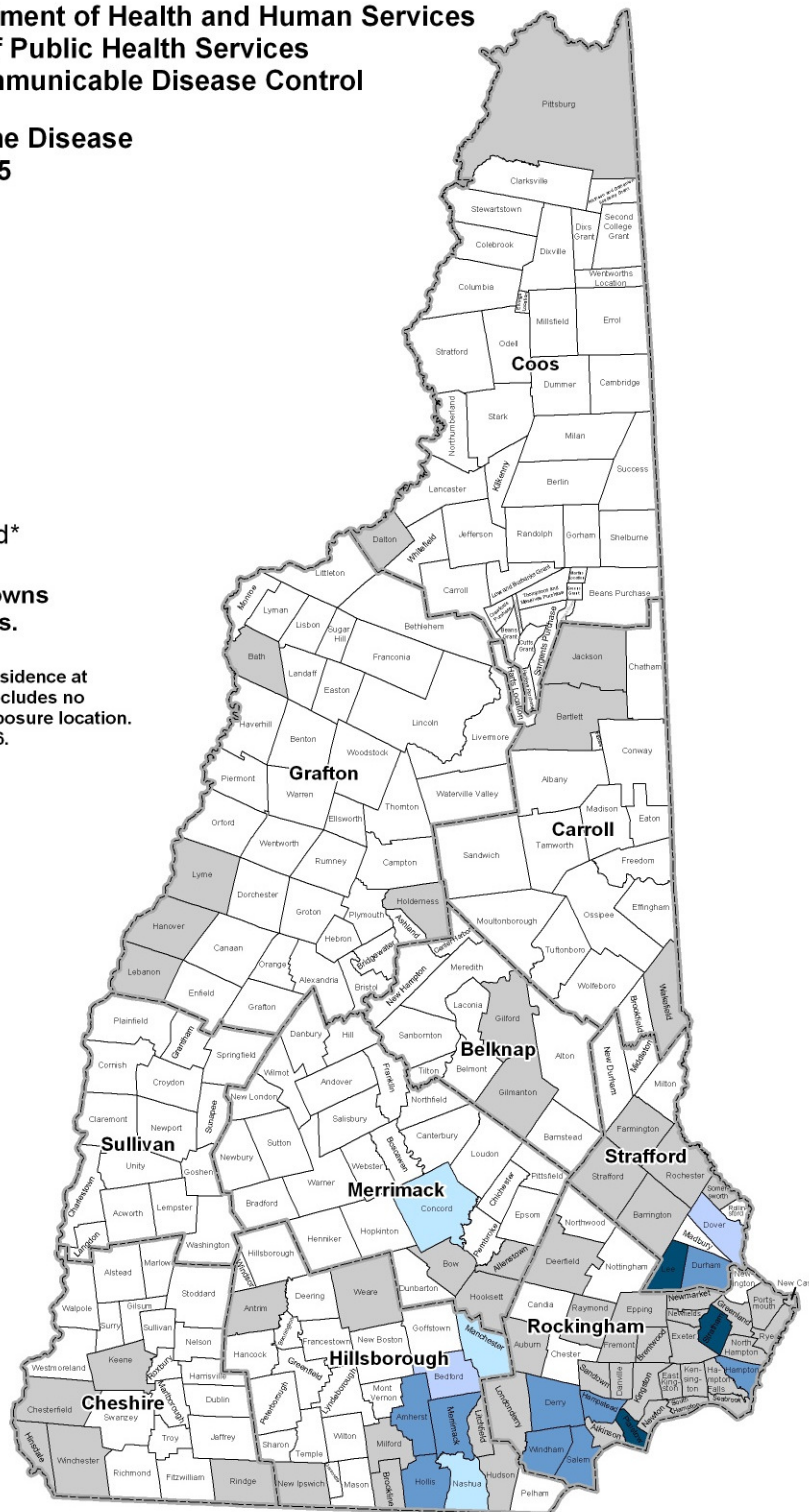
Reported Cases of Lyme Disease
in New Hampshire, 2005

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of April 1, 2006.



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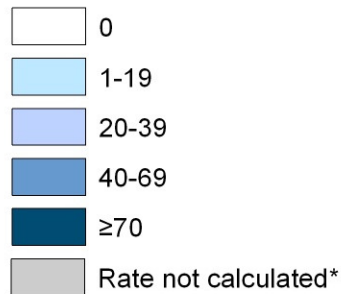
Department of Health & Human Services



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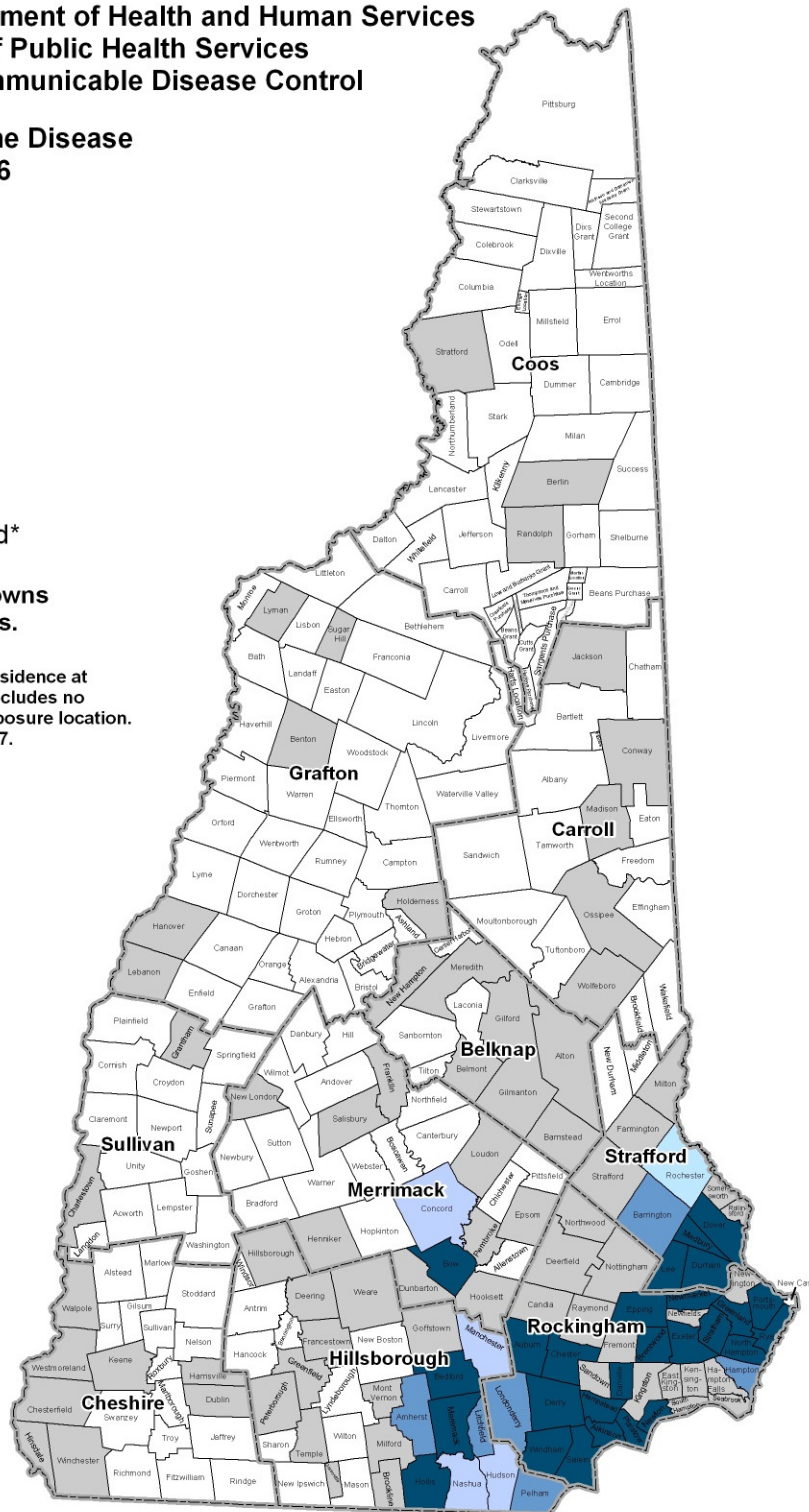
Reported Cases of Lyme Disease
in New Hampshire, 2006

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of May 21, 2007.



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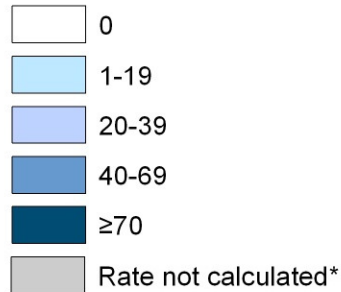
Department of Health & Human Services



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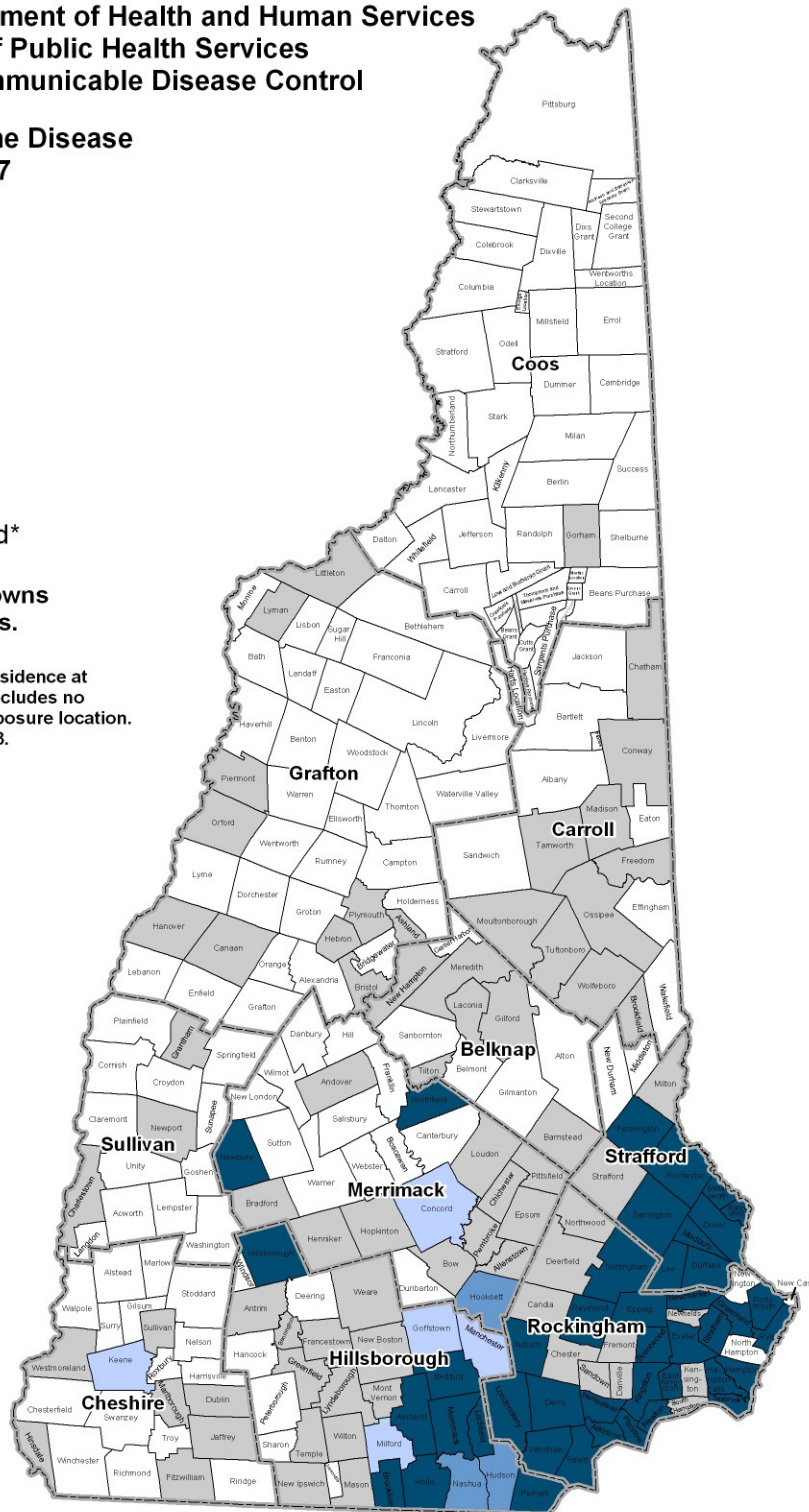
Reported Cases of Lyme Disease
in New Hampshire, 2007

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of April 3, 2008.



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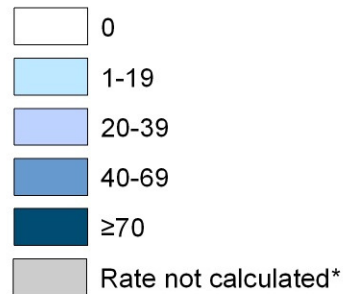
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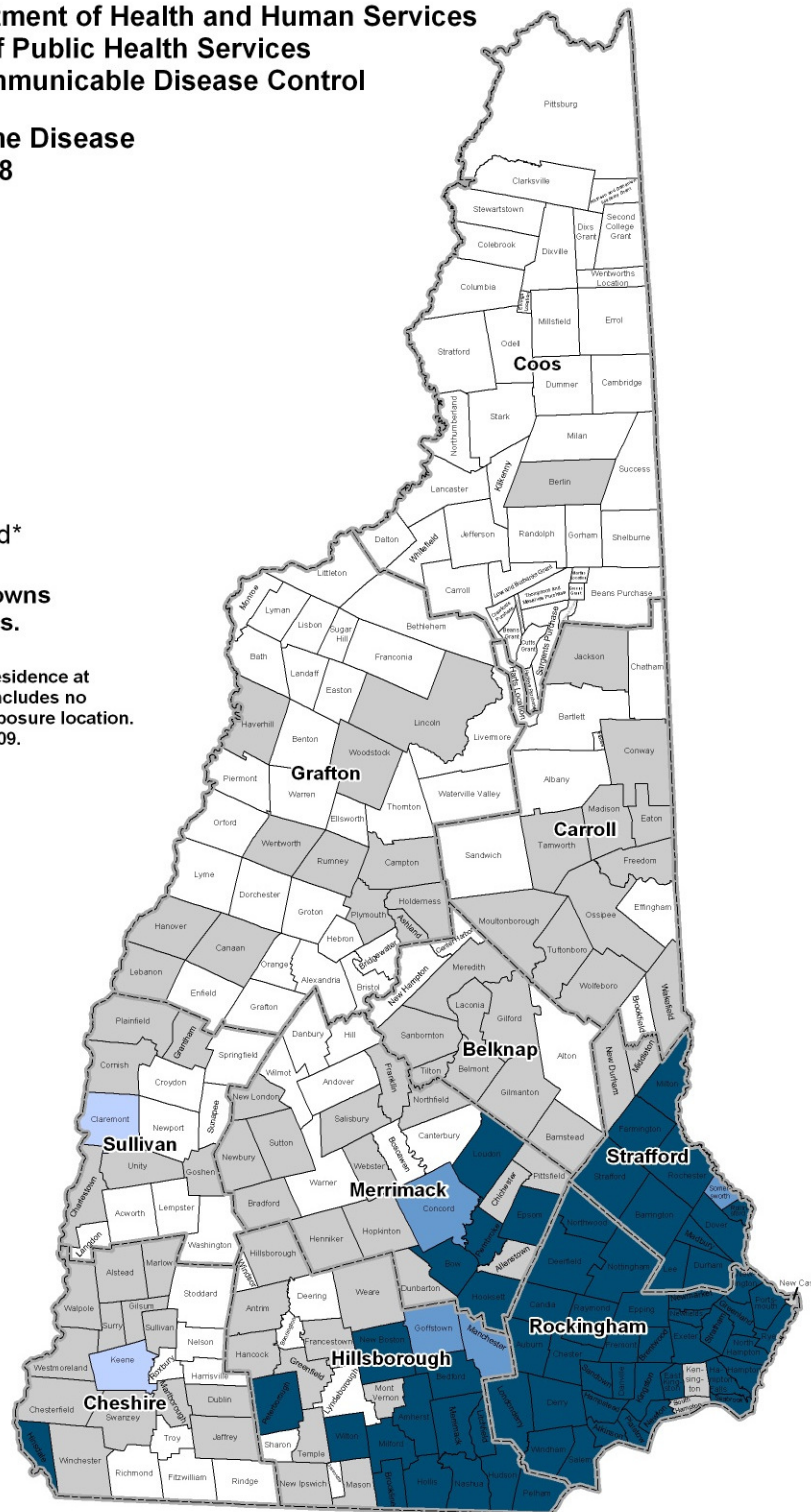
Reported Cases of Lyme Disease
in New Hampshire, 2008

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

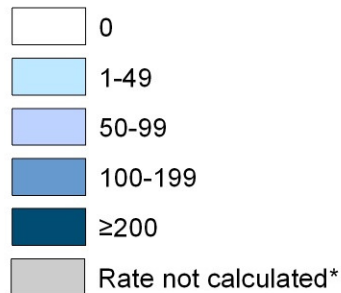
Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of April 14, 2009.



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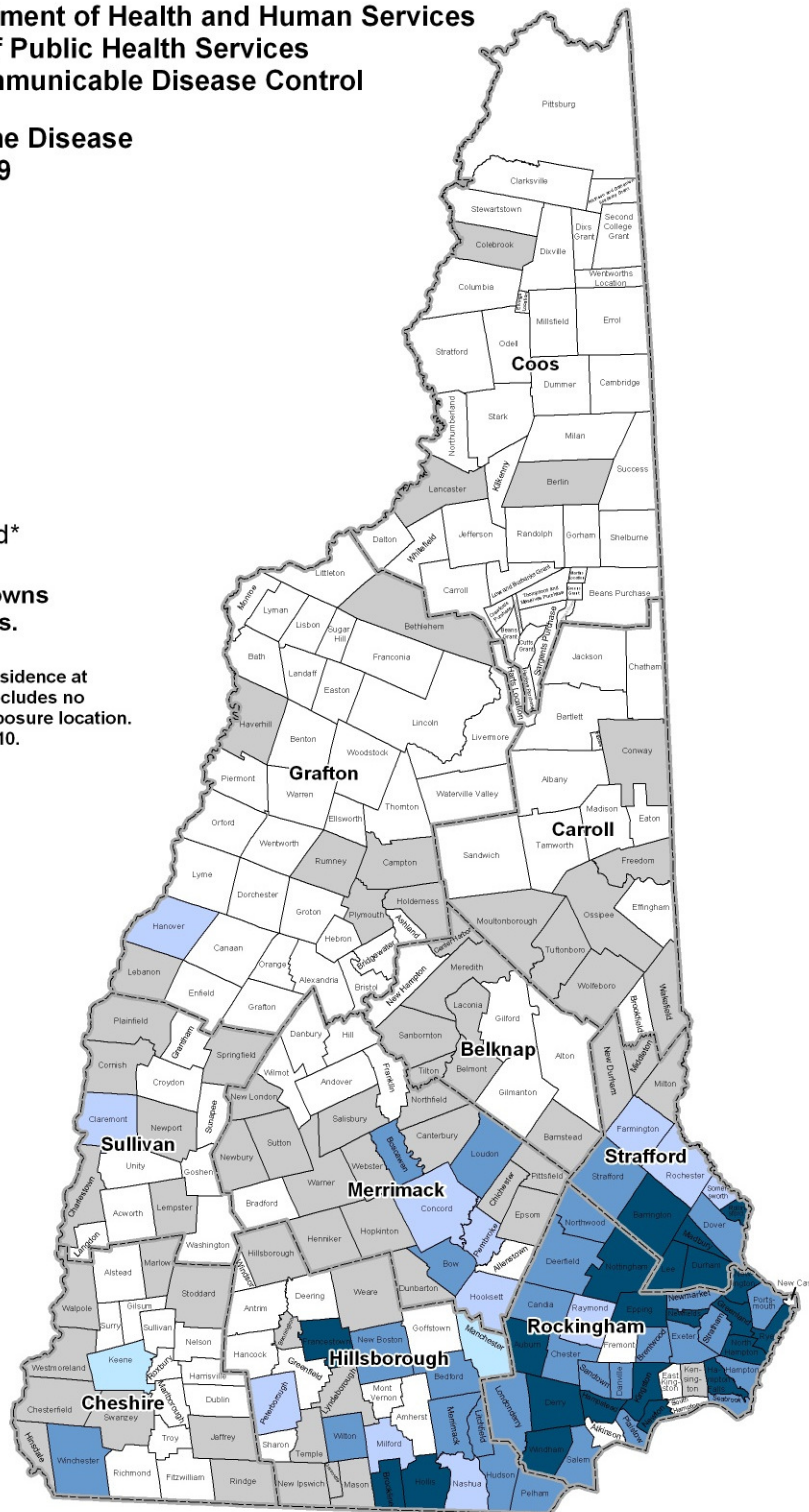
Reported Cases of Lyme Disease
in New Hampshire, 2009

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of June 15, 2010.



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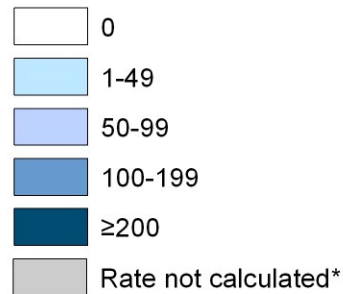
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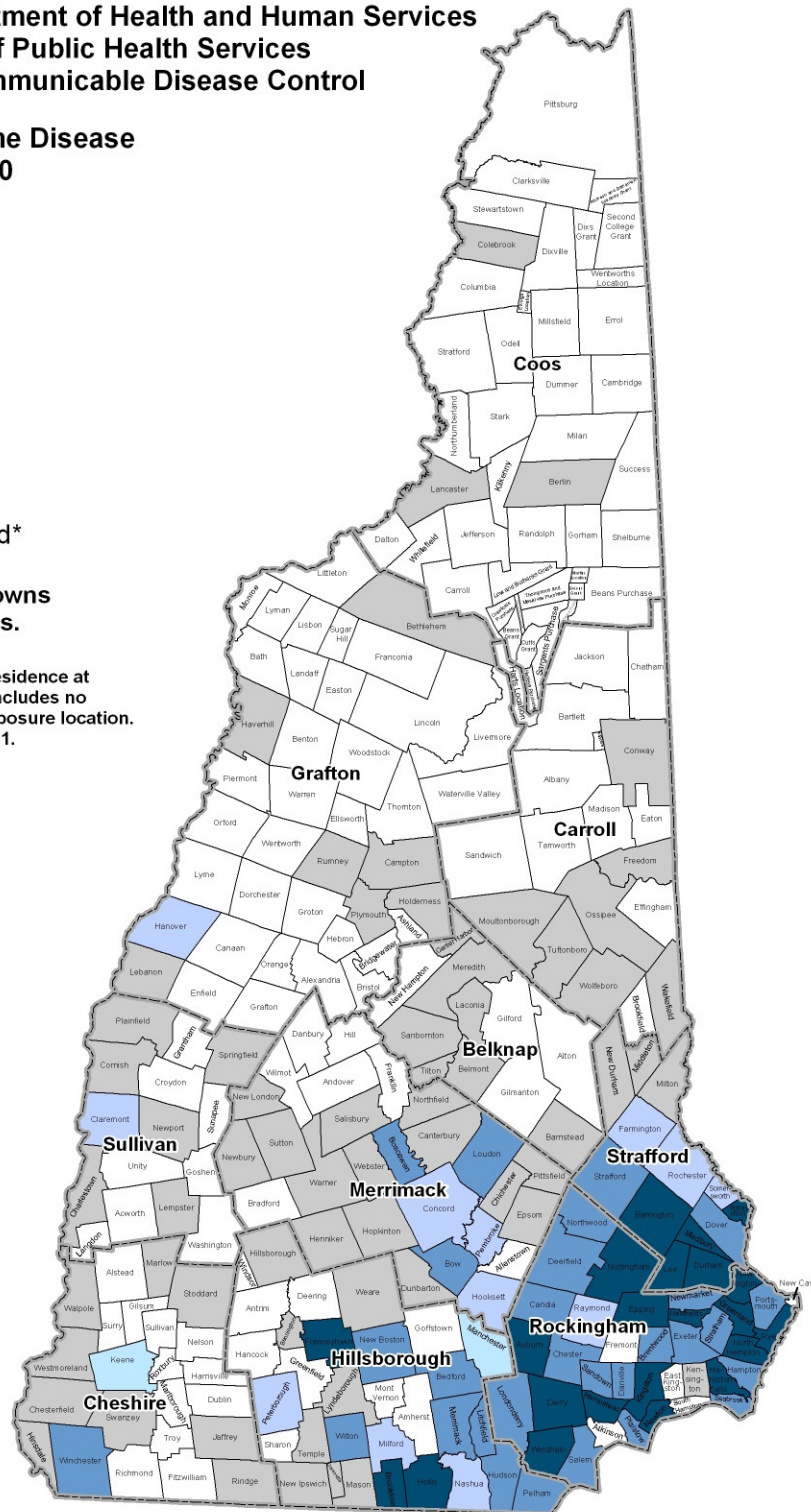
Reported Cases of Lyme Disease
in New Hampshire, 2010

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

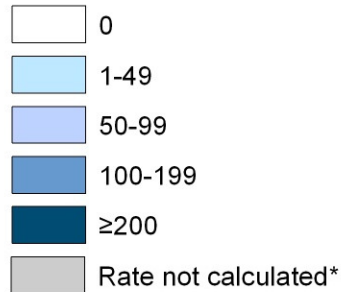
Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of May 21, 2011.



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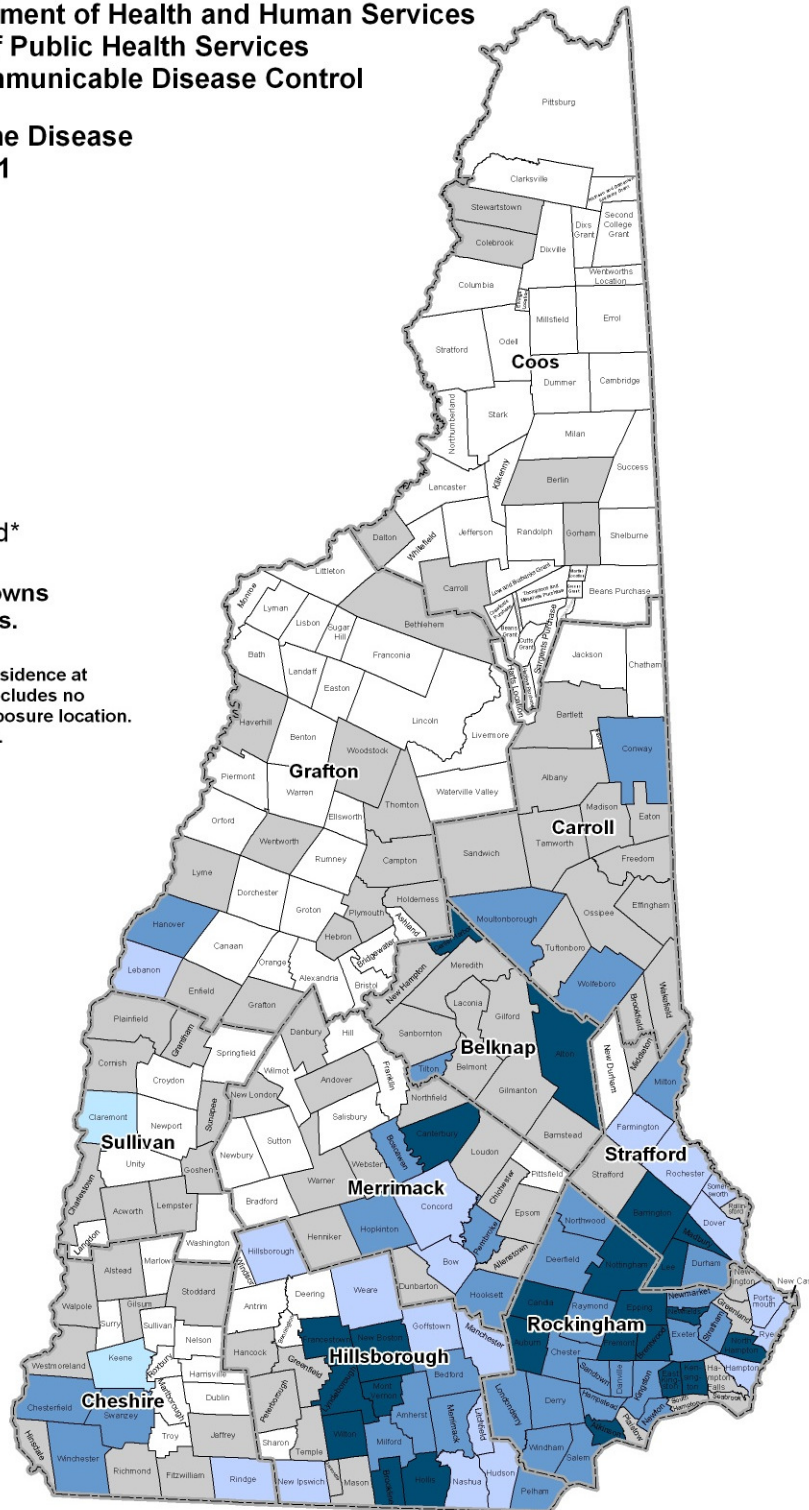
Reported Cases of Lyme Disease
in New Hampshire, 2011

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

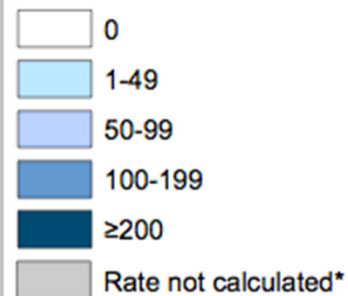
Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of May 4, 2012.



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Division of Public Health Services
Bureau of Infectious Disease Control

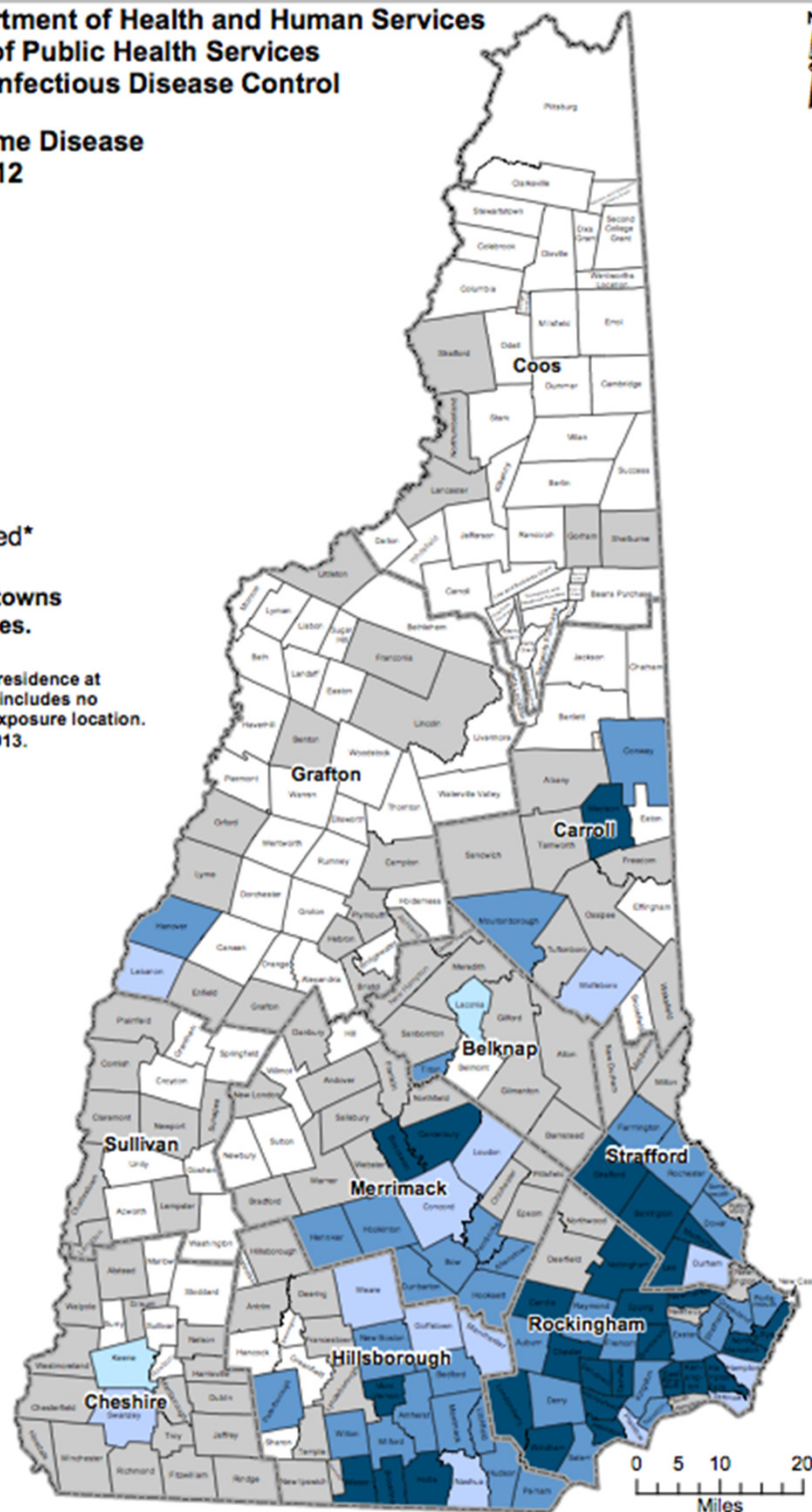
Reported Cases of Lyme Disease
in New Hampshire, 2012

Rates per 100,000



*Rates not calculated for towns
with between 1 and 4 cases.

Note: County/town is based upon residence at
the time of disease diagnosis and includes no
additional information regarding exposure location.
Data are complete as of May 20, 2013.



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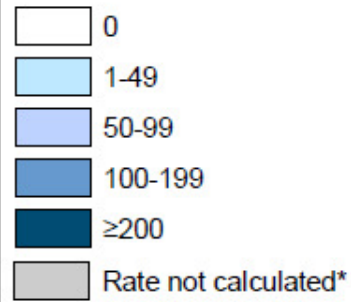
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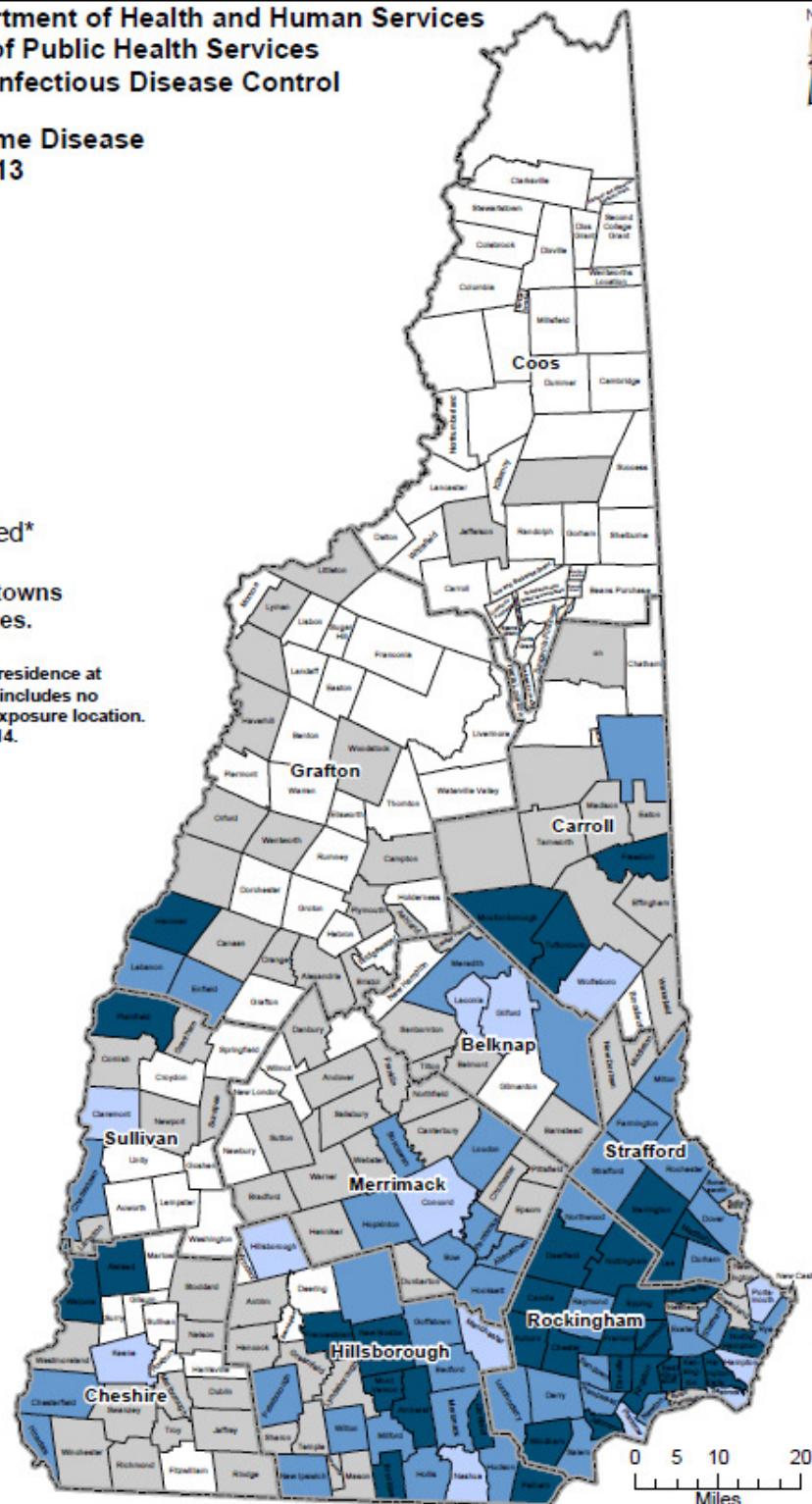
Reported Cases of Lyme Disease
in New Hampshire, 2013

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of May 6, 2014.



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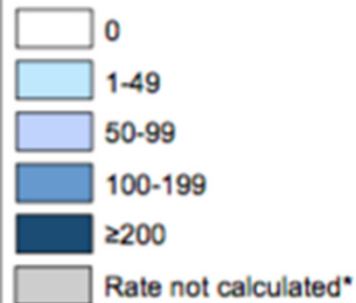
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Division of Public Health Services
Bureau of Infectious Disease Control

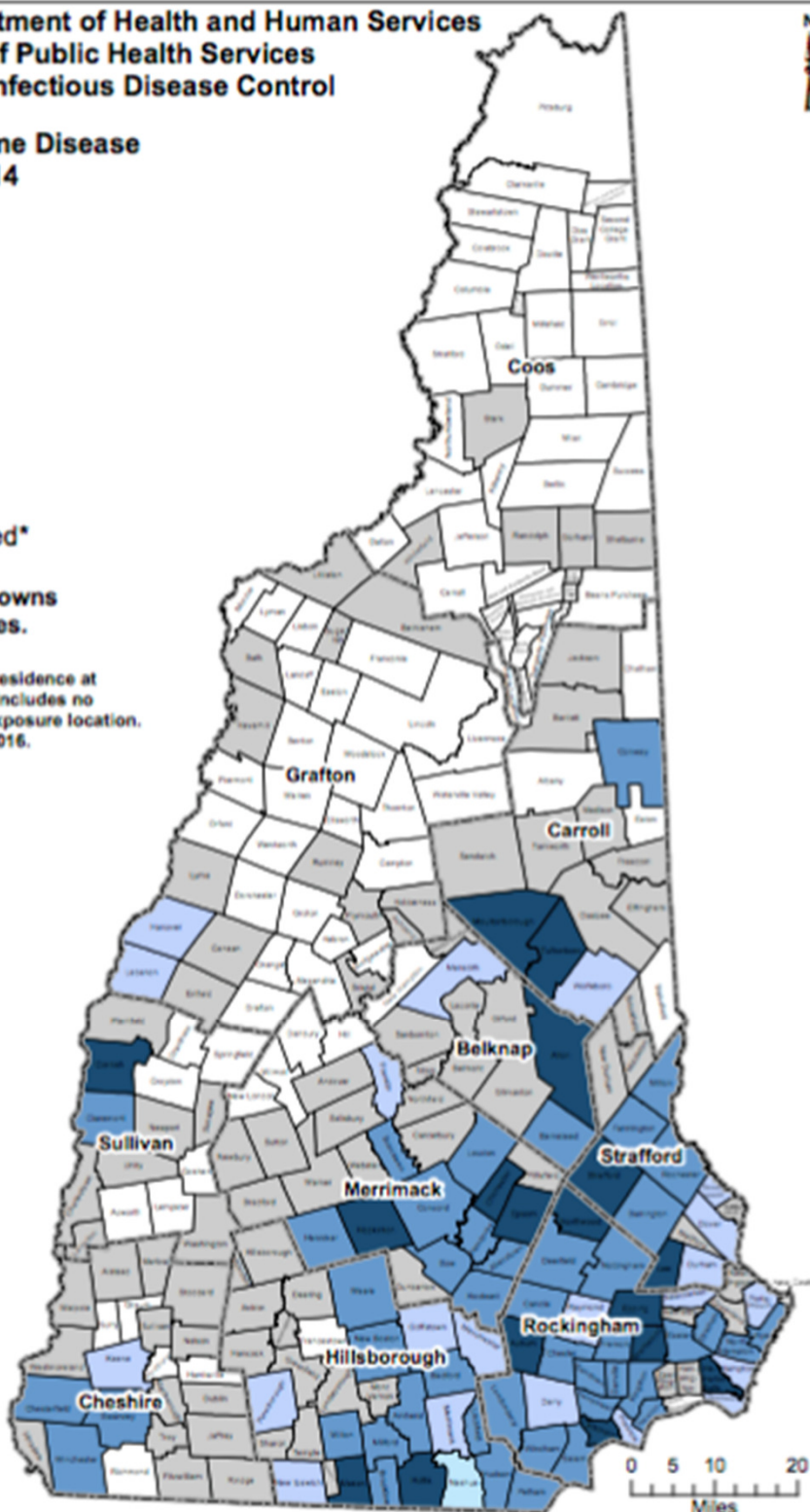
Reported Cases of Lyme Disease
in New Hampshire, 2014

Rates per 100,000



*Rates not calculated for towns with between 1 and 4 cases.

Note: County/town is based upon residence at the time of disease diagnosis and includes no additional information regarding exposure location. Data are complete as of March 1, 2016.



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Proportion of Adult Black-legged Ticks
infected with *Borrelia burgdorferi* (Lyme disease)
Fall 2007-2010 Samplings

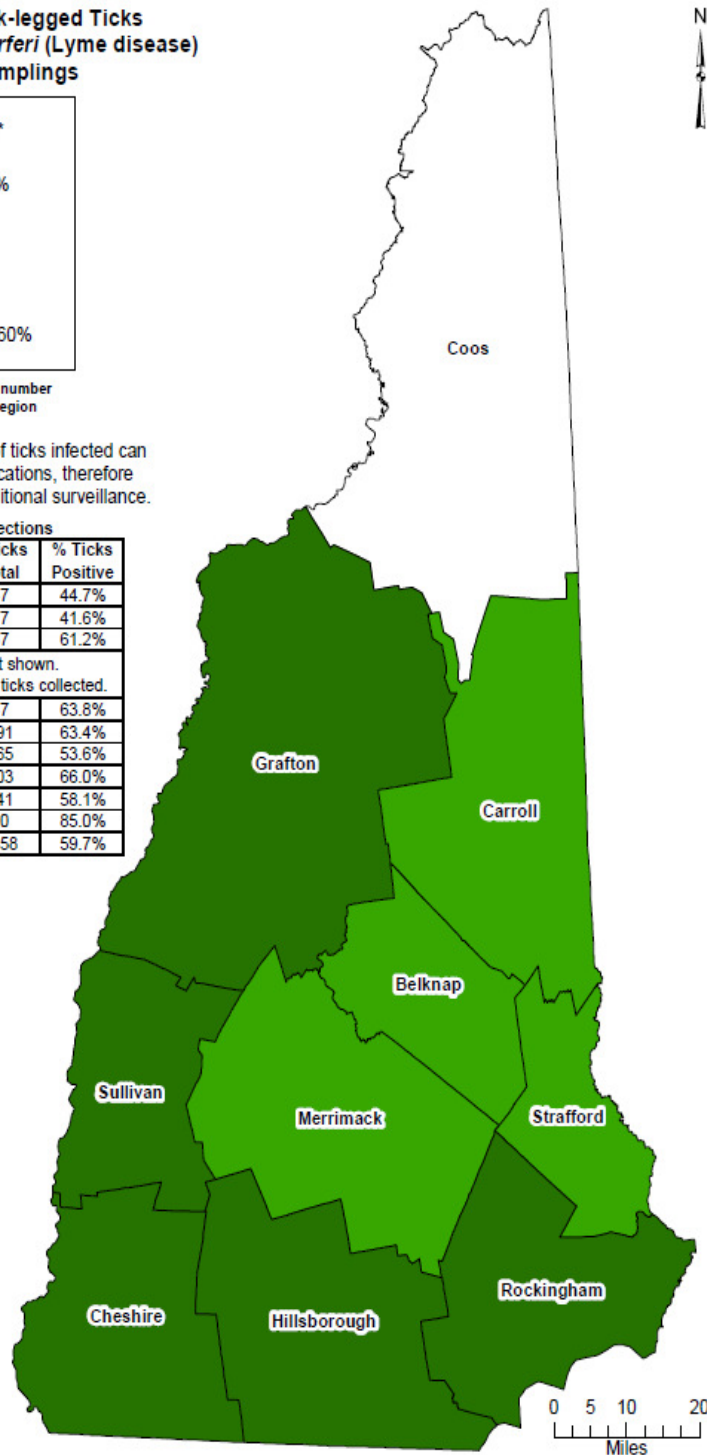


*Not available due to low number
of ticks collected in the region

Tick numbers and percentage of ticks infected can
change between years and locations, therefore
estimates may change with additional surveillance.

2007-2010 Fall Tick Collections

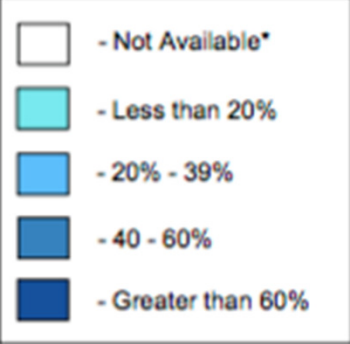
County	# Ticks Positive	# Ticks Total	% Ticks Positive
Belknap	21	47	44.7%
Carroll	32	77	41.6%
Cheshire	41	67	61.2%
Coos	Data not shown. Fewer than 20 ticks collected.		
Grafton	30	47	63.8%
Hillsborough	248	391	63.4%
Merrimack	142	265	53.6%
Rockingham	200	303	66.0%
Strafford	140	241	58.1%
Sullivan	17	20	85.0%
State Total	871	1458	59.7%



Presence of the *Borrelia* bacteria in the NH Black-legged Ticks 2007- 2010



Proportion of Adult Blacklegged Ticks Infected with *Borrelia burgdorferi* (Lyme disease)
Spring and Fall 2013-2014 Samplings



*Not available due to low number of ticks collected in the region

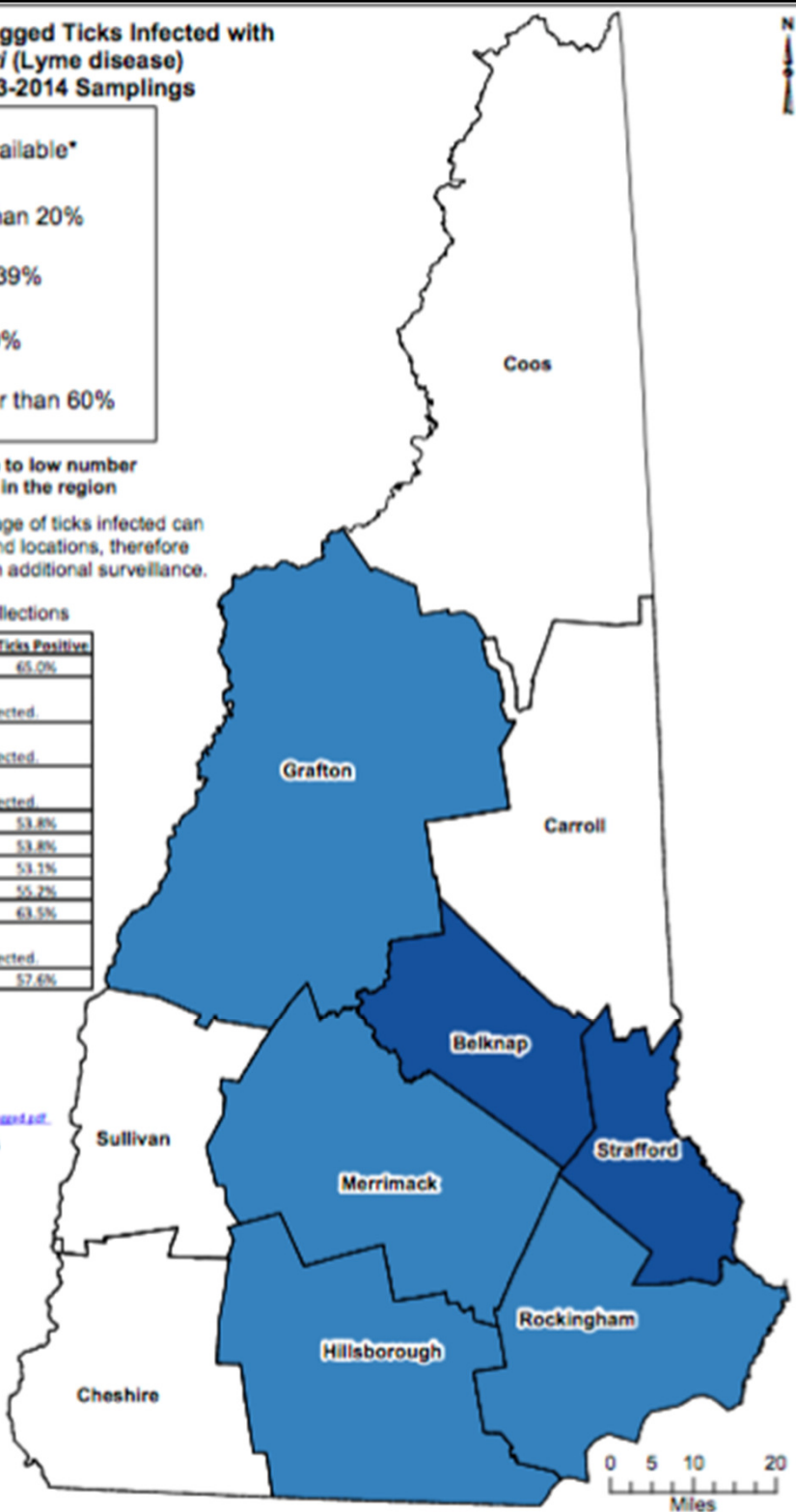
Tick numbers and percentage of ticks infected can change between years and locations, therefore estimates may change with additional surveillance.

2013-2014 Spring and Fall Tick Collections

County	#Ticks Positive	#Ticks Total	%Ticks Positive
Belknap	13	20	65.0%
Carroll	Data not shown. Fewer than 20 ticks collected.		
Cheshire	Data not shown. Fewer than 20 ticks collected.		
Coos	Data not shown. Fewer than 20 ticks collected.		
Grafton	35	65	53.8%
Hillsborough	24	26	53.8%
Merrimack	17	32	53.1%
Rockingham	37	67	55.2%
Strafford	54	85	63.5%
Sullivan	Data not shown. Fewer than 20 ticks collected.		
State Total	170	295	57.6%

- Notes:
1. The data and map from the 2007-2010 samplings can be found here: <http://www.dhhs.nh.gov/dhs/ticks/area/documents/blacklegged.pdf>.
 2. These data show similar prevalence as was observed in the 2007-2010 samplings.
 3. Ticks were collected by flagging and were provided by entomologist, Dr. Alan Eaton with University of New Hampshire Cooperative Extension.

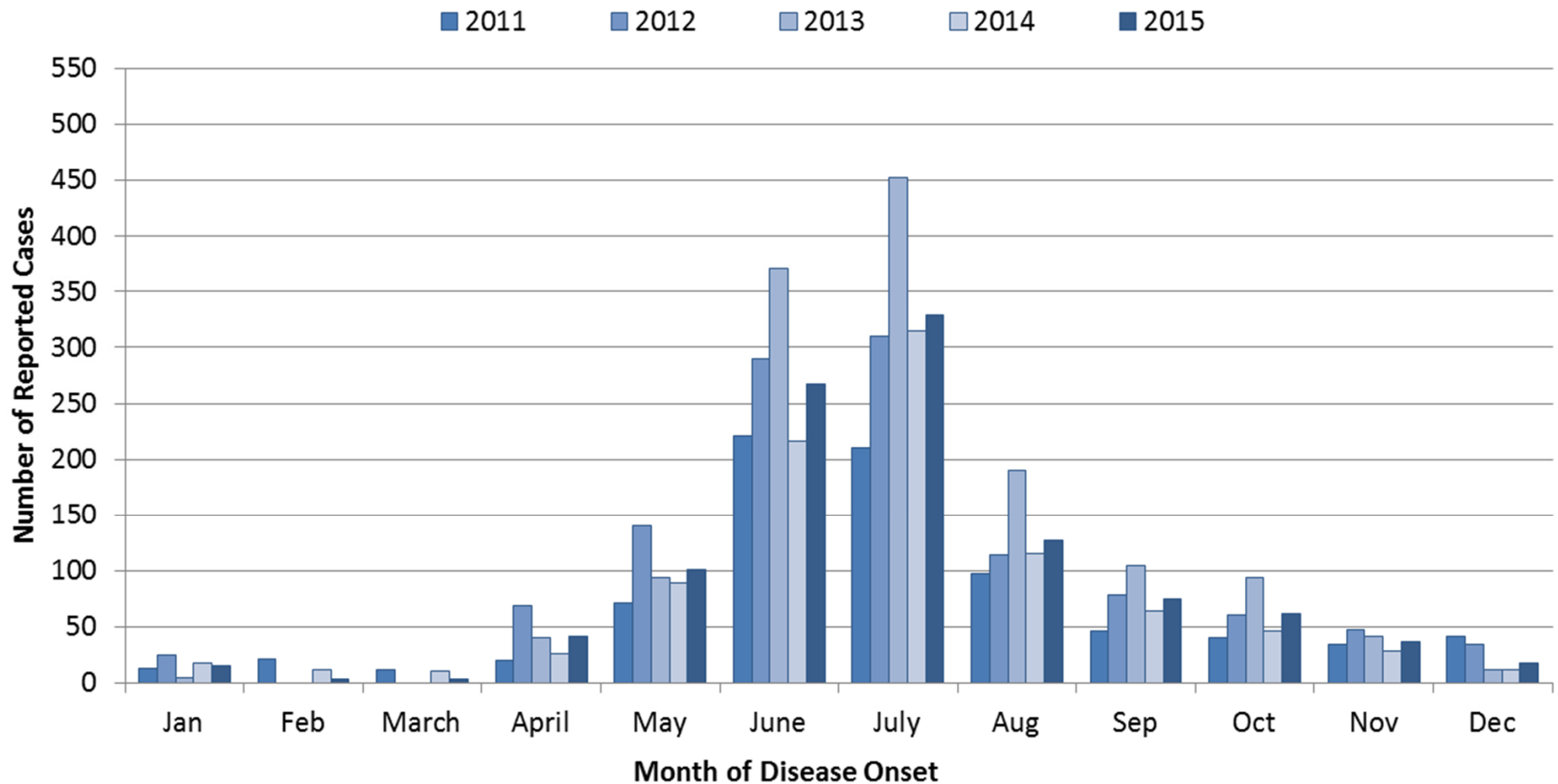
Prepared by Tylor Young, GIS Analyst,
New Hampshire Department of Health
and Human Services, Bureau of Infectious
Disease Control, August 14, 2015



Presence of the *Borrelia* bacteria in the NH Blacklegged Ticks 2013- 2014



Number of reported Lyme disease cases by month, NH, 2011-2015

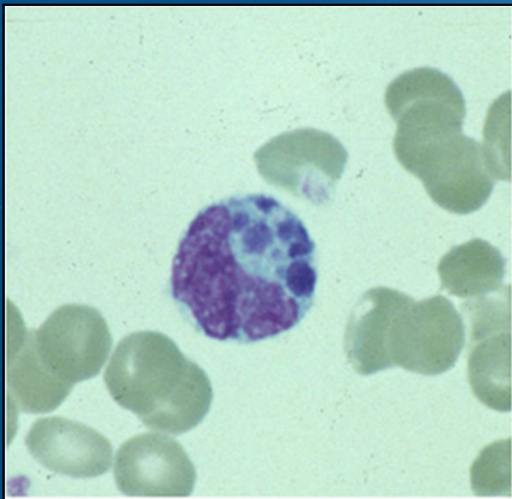


Anaplasmosis and Babesiosis

Anaplasmosis and Babesiosis

Anaplasmosis

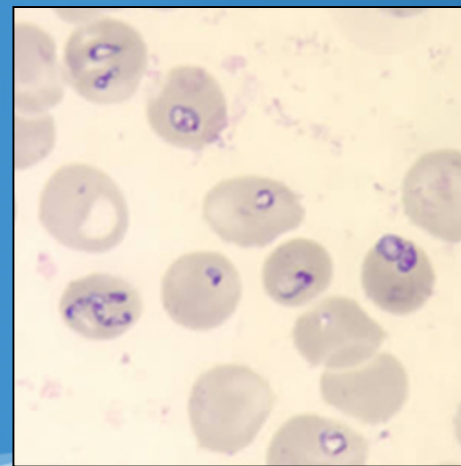
- **Bacterium** *Anaplasma phagocytophilum*
- Rarely causes a rash
- Potential to cause renal failure, difficulty breathing
- Severity ranges from mild to life-threatening



Images from cdc.gov

Babesiosis

- RBC parasite *Babesia microti*
- No rash
- Potential to cause hemolytic anemia, renal failure
- Severity ranges from asymptomatic to life-threatening



Anaplasmosis and Babesiosis

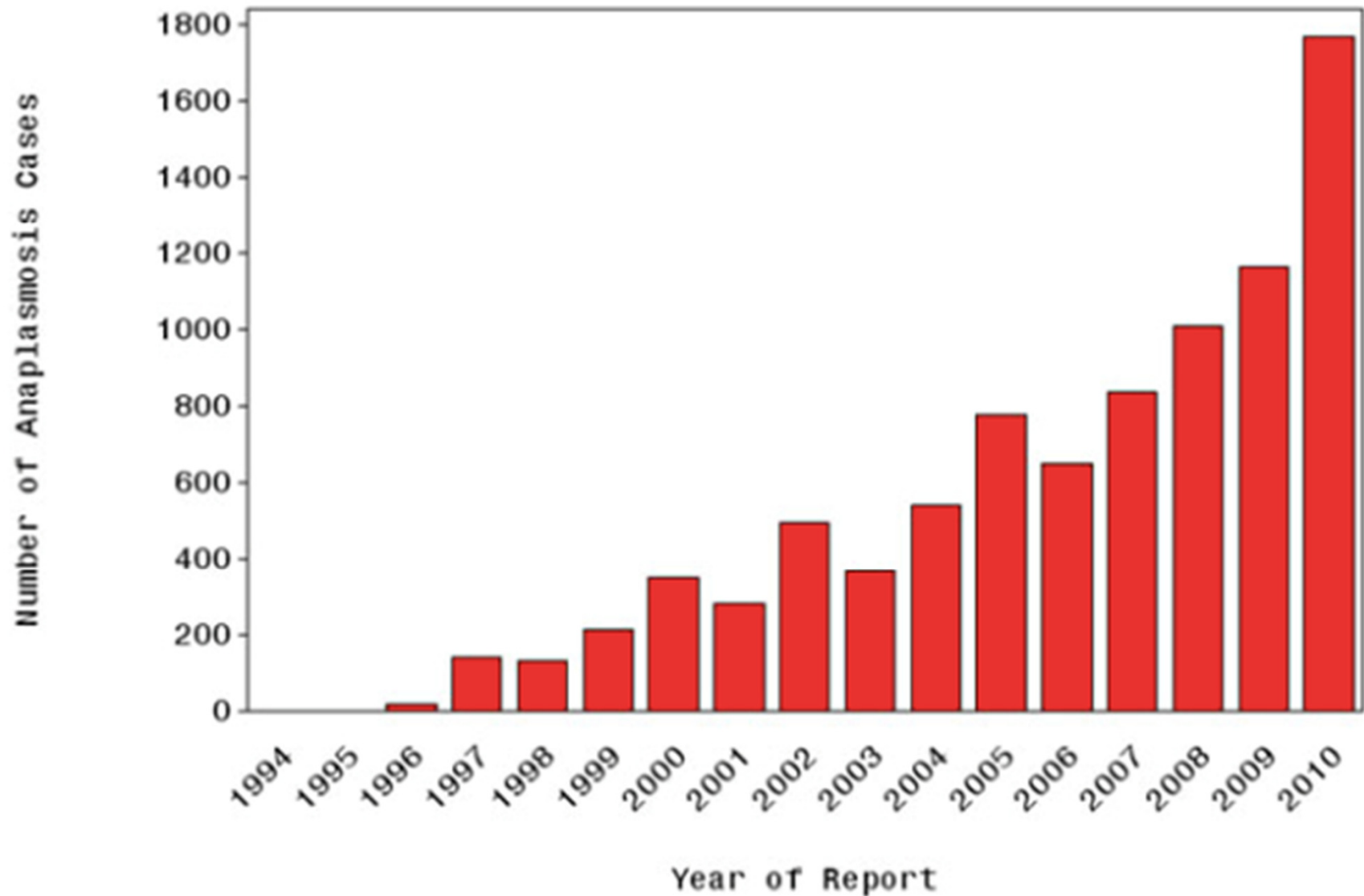
- Transmitted by the blacklegged tick
- Main reservoir is the white footed mouse
- Flu-like symptoms (most common presentation)
 - Fever, headache, muscle pain, malaise, chills, nausea/abdominal pain, cough, confusion, sweats, headache, body aches, loss of appetite, nausea, fatigue



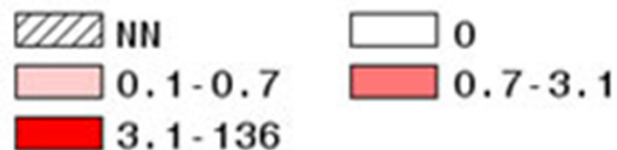
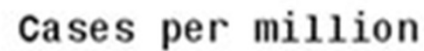
Image from
http://www.fcps.edu/islandcreekes/ecology/white-footed_mouse.htm

Number of U.S. Anaplasmosis Cases

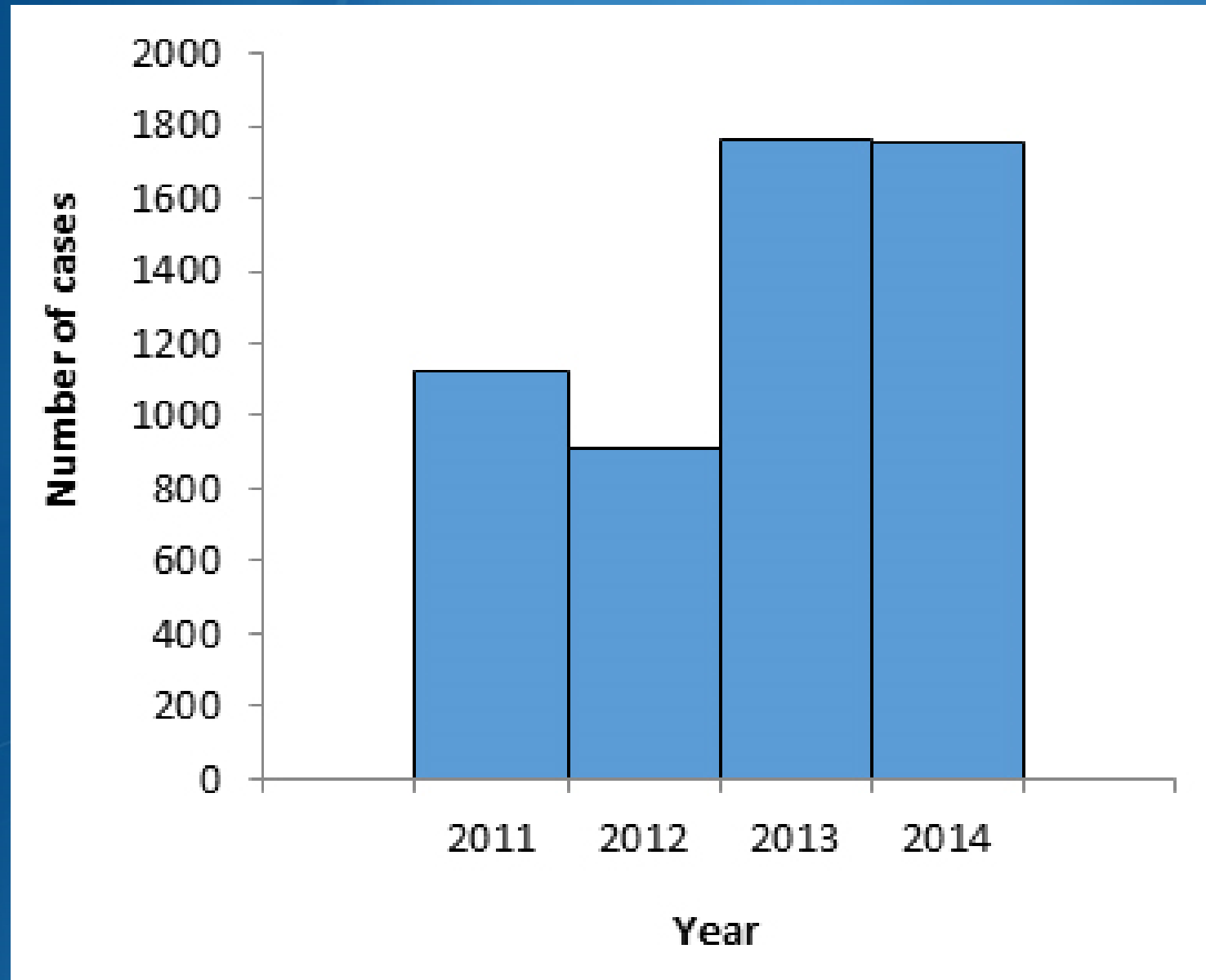
Number of Annual Anaplasmosis Cases, 1994-2010



Anaplasmosis Incidence, 2010

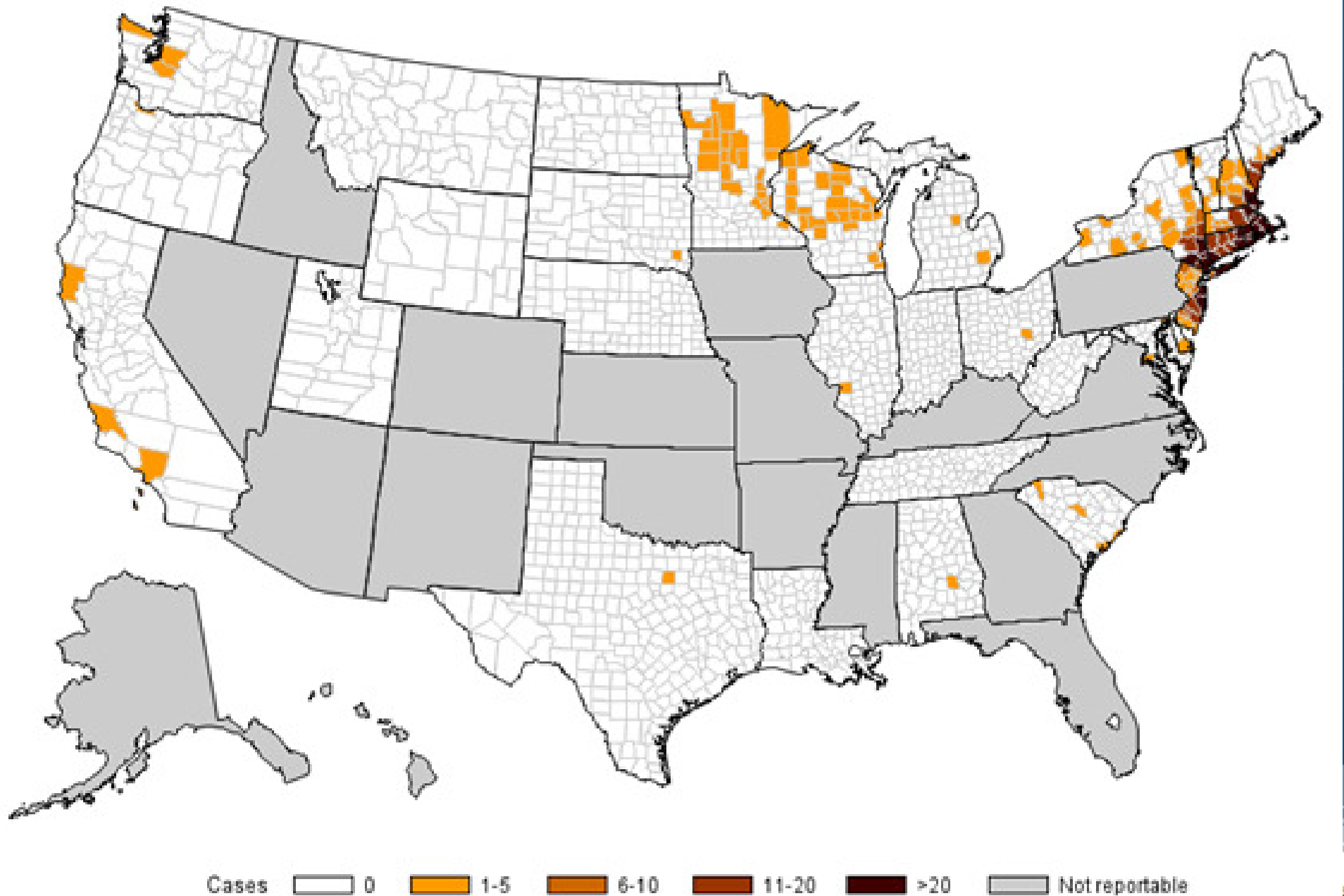


Number of U.S. Babesiosis Cases

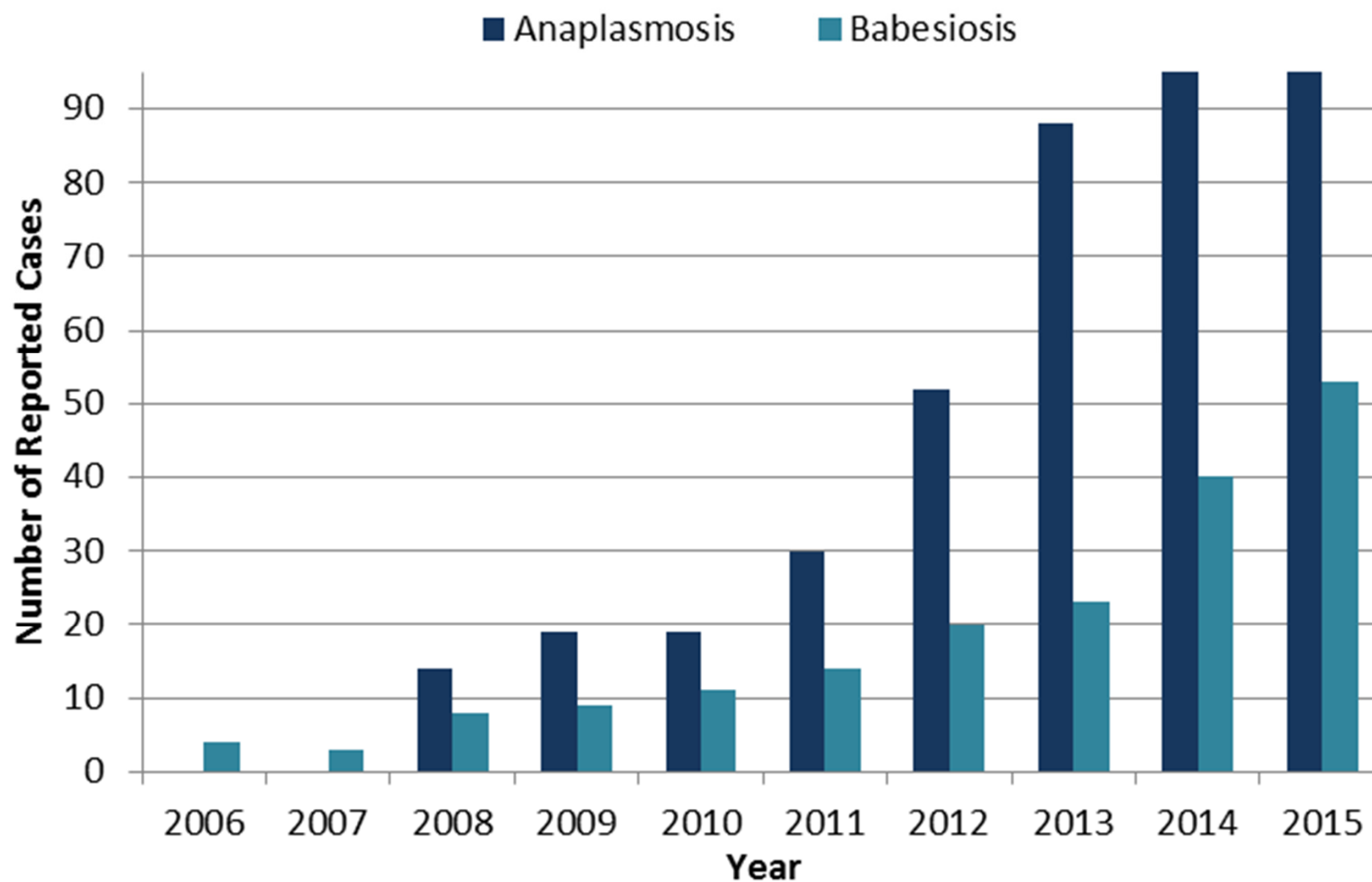


Source: CDC

Distribution of Babesia, 2013



Reported Anaplasmosis and Babesiosis Cases by Year, New Hampshire



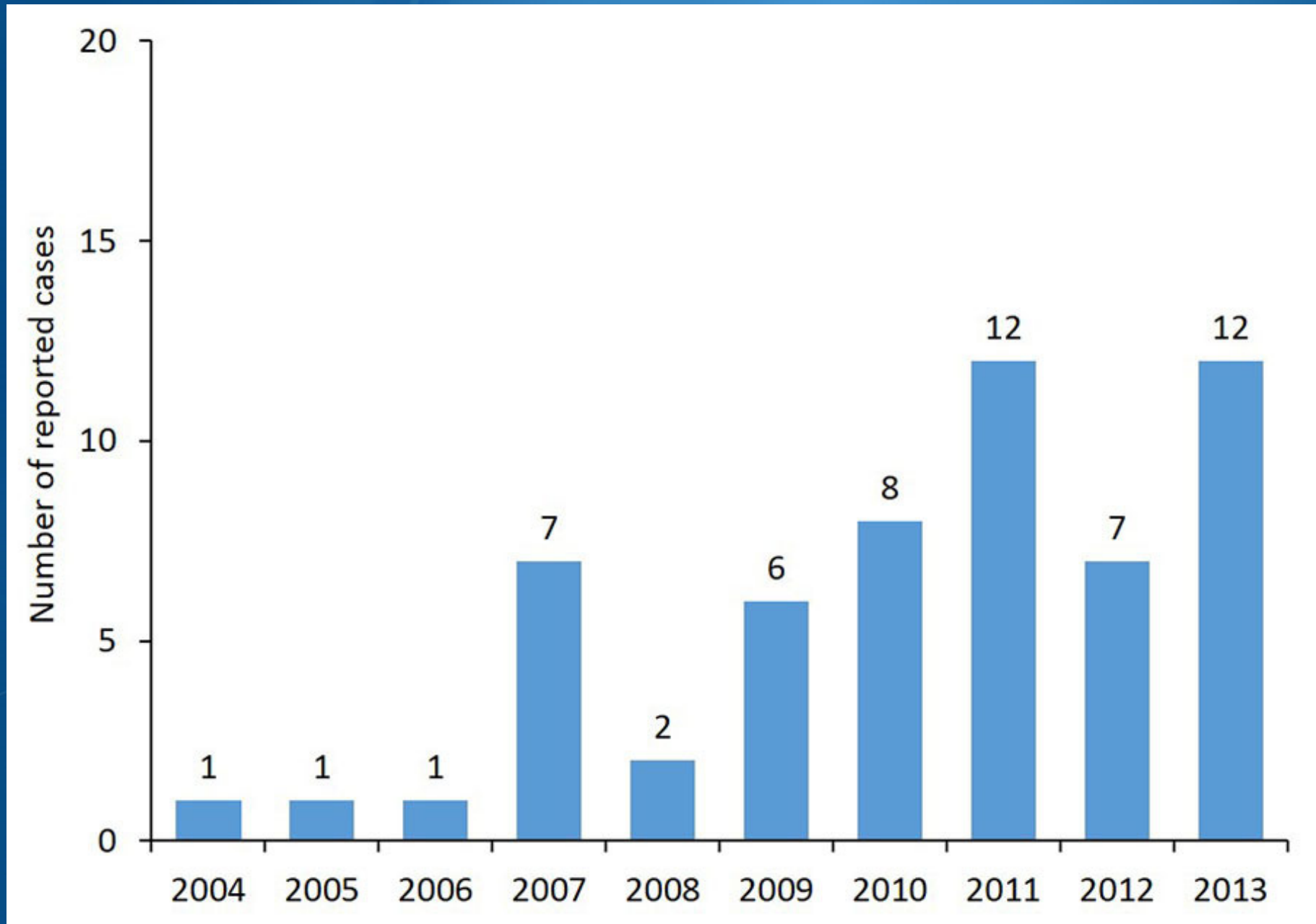
Powassan Virus

Powassan Virus



- Viral encephalitis
- Incubation from 1 week to 1 month
- Two strains associated with human disease
 - Powassan Virus (POW) – Lineage 1
 - Deer Tick Virus (DTV) – Lineage 2
 - Ixodes scapularis – white-footed mice (DTV)
- Possible symptoms: Drowsiness, headache, confusion, fever, vomiting, weakness, speech difficulties
- Illness could progress to encephalitis (brain), meningitis (membranes), or meningoencephalitis
- Severe, long lasting sequelae in $\geq 50\%$
- Case fatality $\sim 10\%$ (encephalitis)

Powassan Virus – US 2004-2013



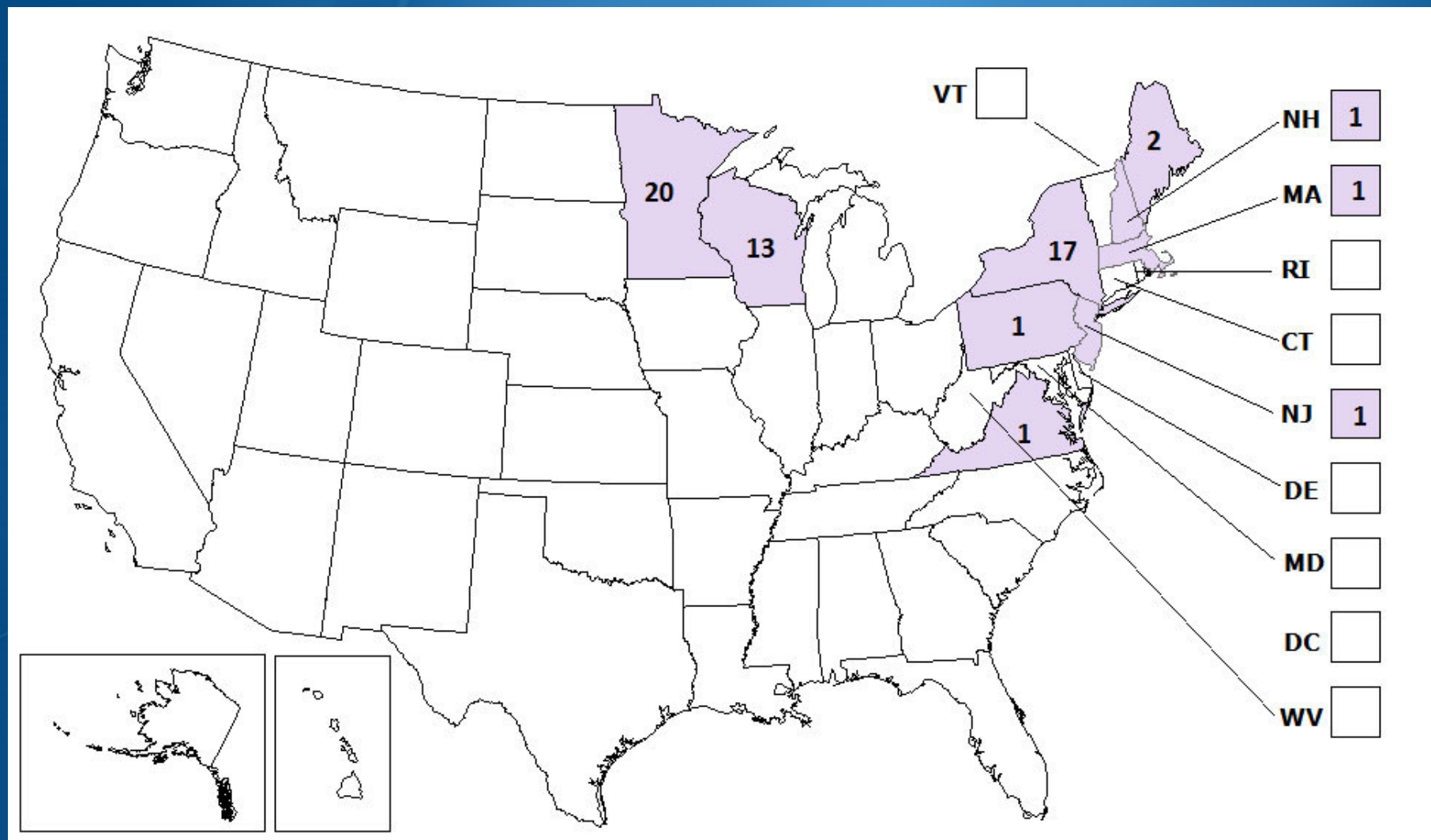
Source: cdc.gov and ArboNET



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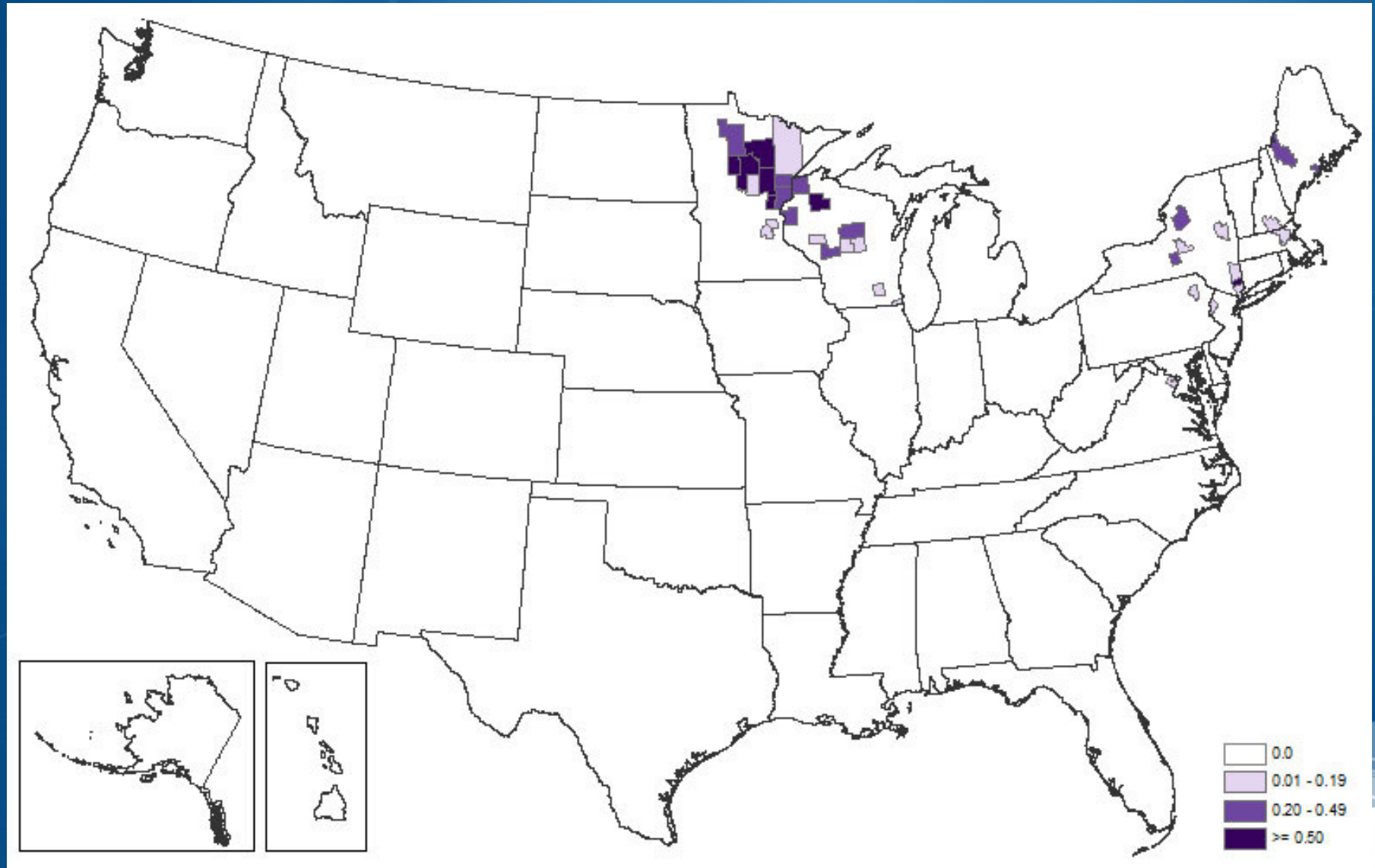


Distribution of Powassan Virus 2004-2013



Source: cdc.gov and ArboNET

Distribution of Powassan Virus 2004-2013



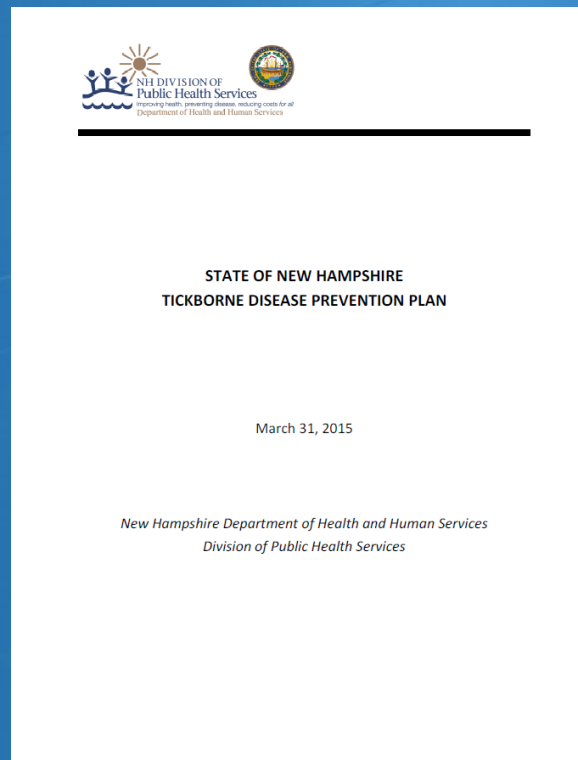
Source: cdc.gov and ArboNET

Tickborne Disease Prevention

Tickborne Disease Prevention

- We have a state plan!

<http://www.dhhs.nh.gov/dphs/cdcs/lyme/documents/tbdpreventionplan.pdf>



Personal Protective Measures: Mosquito and Tick Repellent

- DEET

- Mosquitoes and Ticks

- Oil of Lemon Eucalyptus

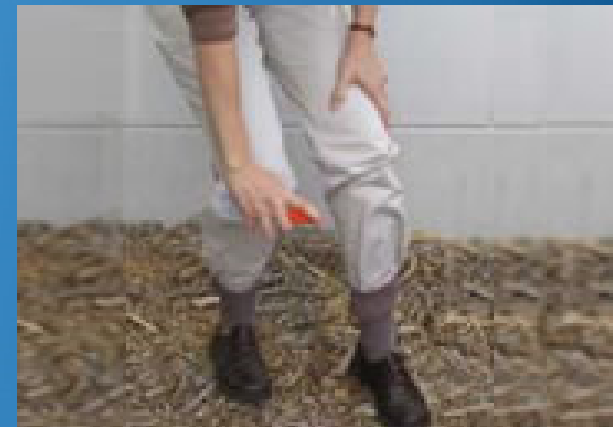
- Mosquitoes and Ticks

- Picaridin

- Mosquitoes

- Permethrin

- Mosquitoes and Ticks
- Applied to clothing
- Permethrin impregnated clothing



Mosquito and Tick Repellent

- Always use according to the product label
- For information on EPA registered repellents and their active ingredients:

<https://www.epa.gov/insect-repellents/find-insect-repellent-right-you>



Protect Yourself Against Tick Bites

- **EVERYONE** should be doing/advocating for these
- Use an EPA registered repellent
- Stay on cleared trails and out of tall grass when possible
- Wear long pants, long sleeves, hat, closed-toe shoes
 - Tuck shirts into pants and pants into socks
 - Light colors may make ticks on clothing easier to spot
- Daily tick checks for you and your pets, remove promptly
- Shower after returning indoors
- Dry clothes in hot dryer

It's Lyme Time!

Protect Yourself Against Lyme Disease*
in Spring, Summer, and Fall



**Lyme disease, the most common tick-borne disorder in the U.S., can affect the skin, joints, nervous system, heart, and eyes. Lyme disease is transmitted by a tiny tick the size of the period at the end of this sentence.*

Tick Habitat



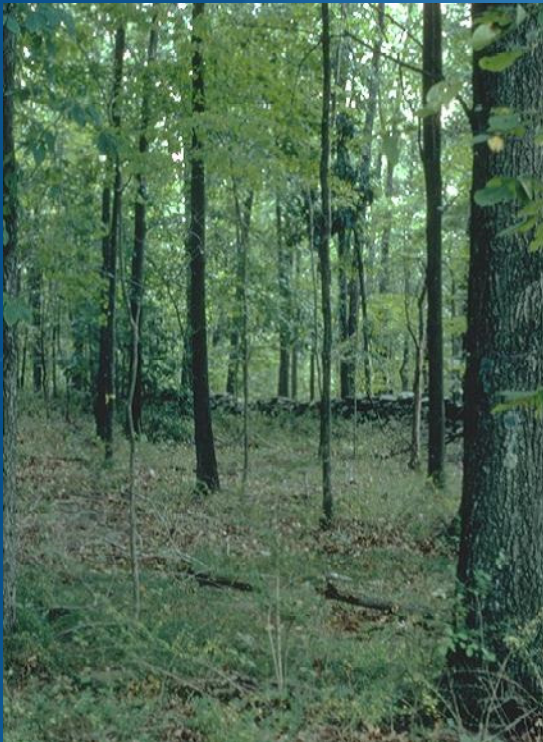
Ticks prefer sheltered, humid areas away from direct sunlight

Tall grass

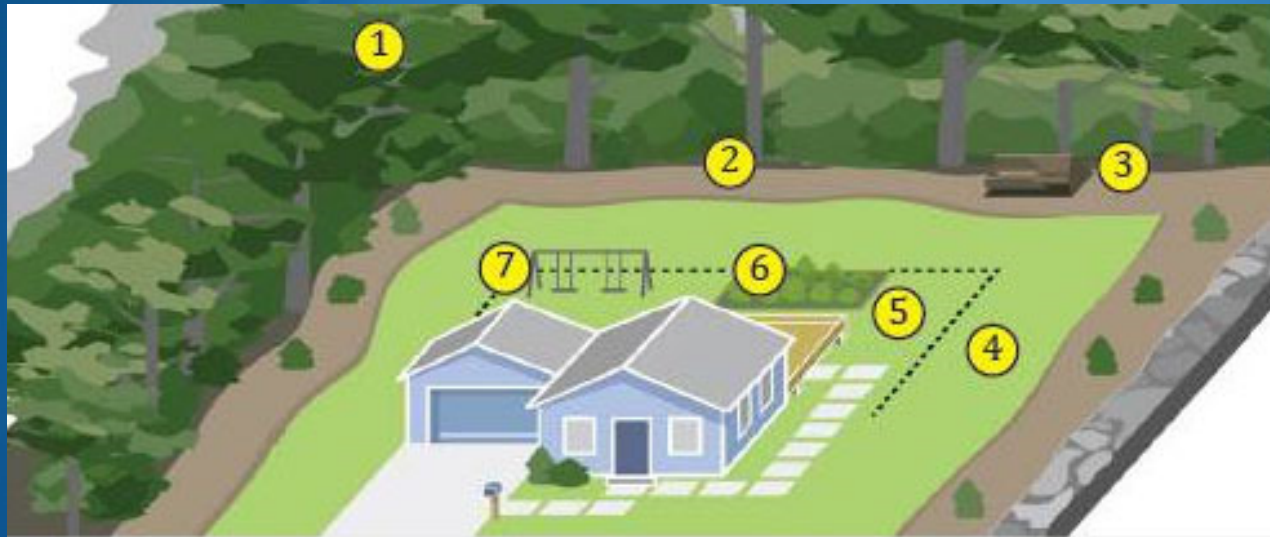
Brush

Leaf litter

All make great tick habitat



Create a “Tick-Safe Zone”



- | | | |
|---|----------------------------|---|
| 1 | Tick zone | Avoid areas with forest and brush where deer, rodents, and ticks are common. |
| 2 | Wood chip barrier | Use a 3 ft. barrier of wood chips or rock to separate the “tick zone” and rock walls from the lawn. |
| 3 | Wood pile | Keep wood piles on the wood chip barrier, away from the home. |
| 4 | Tick migration zone | Maintain a 9 ft. barrier of lawn between the wood chips and areas such as patios, gardens, and play sets. |
| 5 | Tick safe zone | Enjoy daily living activities such as gardening and outdoor play inside this perimeter. |
| 6 | Gardens | Plant deer resistant crops. If desired, an 8-ft. fence can keep deer out of the yard. |
| 7 | Play sets | Keep play sets in the “tick safe zone” in sunny areas where ticks have difficulty surviving. |

Based on a diagram by K. Stafford, Connecticut Agricultural Experiment Station

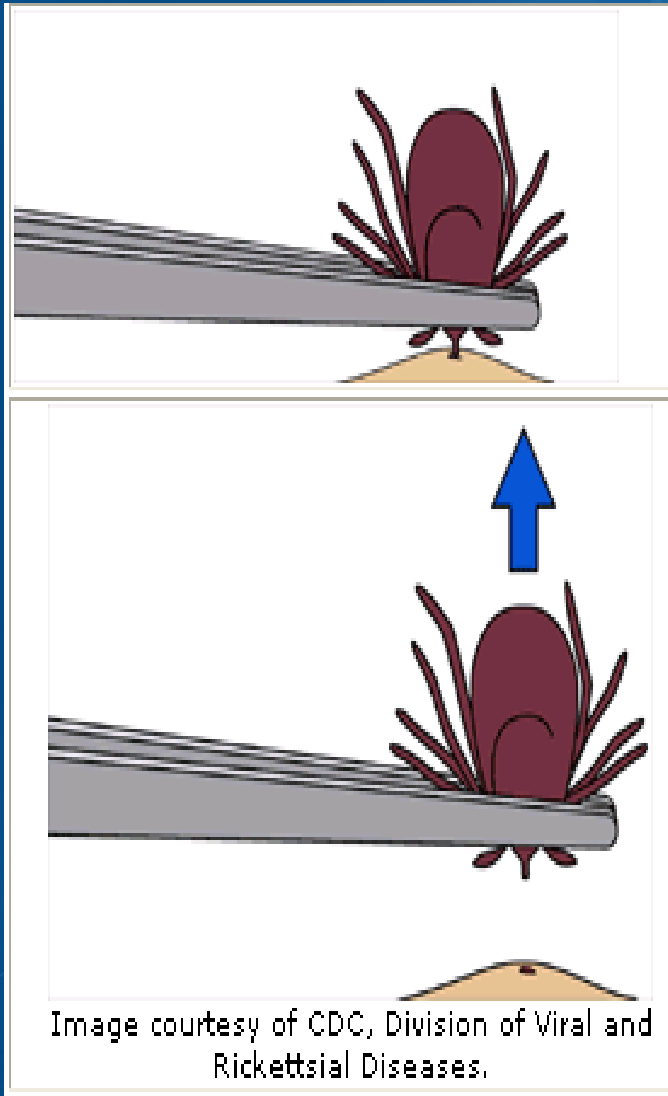


Connecticut
Agricultural
Experiment Station

Prevention Methods and Priorities

- Management of landscaping for schools and communal use areas
- Treatment and/or exclusion of deer
 - An option, but requires extensive maintenance and other considerations
- Treatment and exclusion of mice
 - Owner based decisions
- What about host elimination?
- Area wide acaricide treatment

Tick Removal



- Grasp tick's mouth parts close to the skin with tweezers
- Pull the tick slowly upwards using a gentle, straight-up motion
- Cleanse your hands and the area around the tick
- Apply an antiseptic to the site

Tick Removal

- Do NOT:
 - Twist or jerk the tick
 - Squeeze the tick
 - Rub petroleum jelly on the tick
 - Pour kerosene or nail polish on the tick
 - Use a hot match or cigarette

Tick Removal

- <https://www.youtube.com/watch?v=1Vj-qhxCJbA>

Acknowledgments

- NH DHHS Division of Public Health Services
 - Benjamin Chan, Elizabeth Talbot, Elizabeth Daly, Carolyn Fredette, Tylor Young
- NH Public Health Laboratories
 - Christine Bean, Fengxiang Gao, Denise Bolton, Carol Loring, Amanda Cosser, Trevor Lester

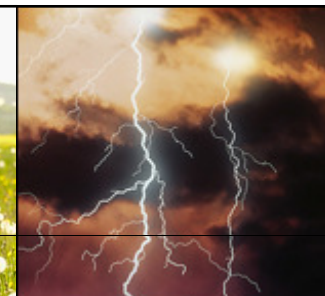
Questions?

- Helpful resources

- <http://www.dhhs.nh.gov/dphs/cdcs/index.htm>
- <http://www.cdc.gov/ncezid/dvbd/>
- <http://www.ct.gov/caes/site/default.asp>

- Contact information:

abigail.mathewson@dhhs.nh.gov
(603) 271-0274 or
(603) 271-4496



Winter Weather & the Health Effects of Cold Stress

February 7, 2017

Solid Waste Operators Training (SWOT)

Matt Cahillane, NH DHHS

Learning Objectives

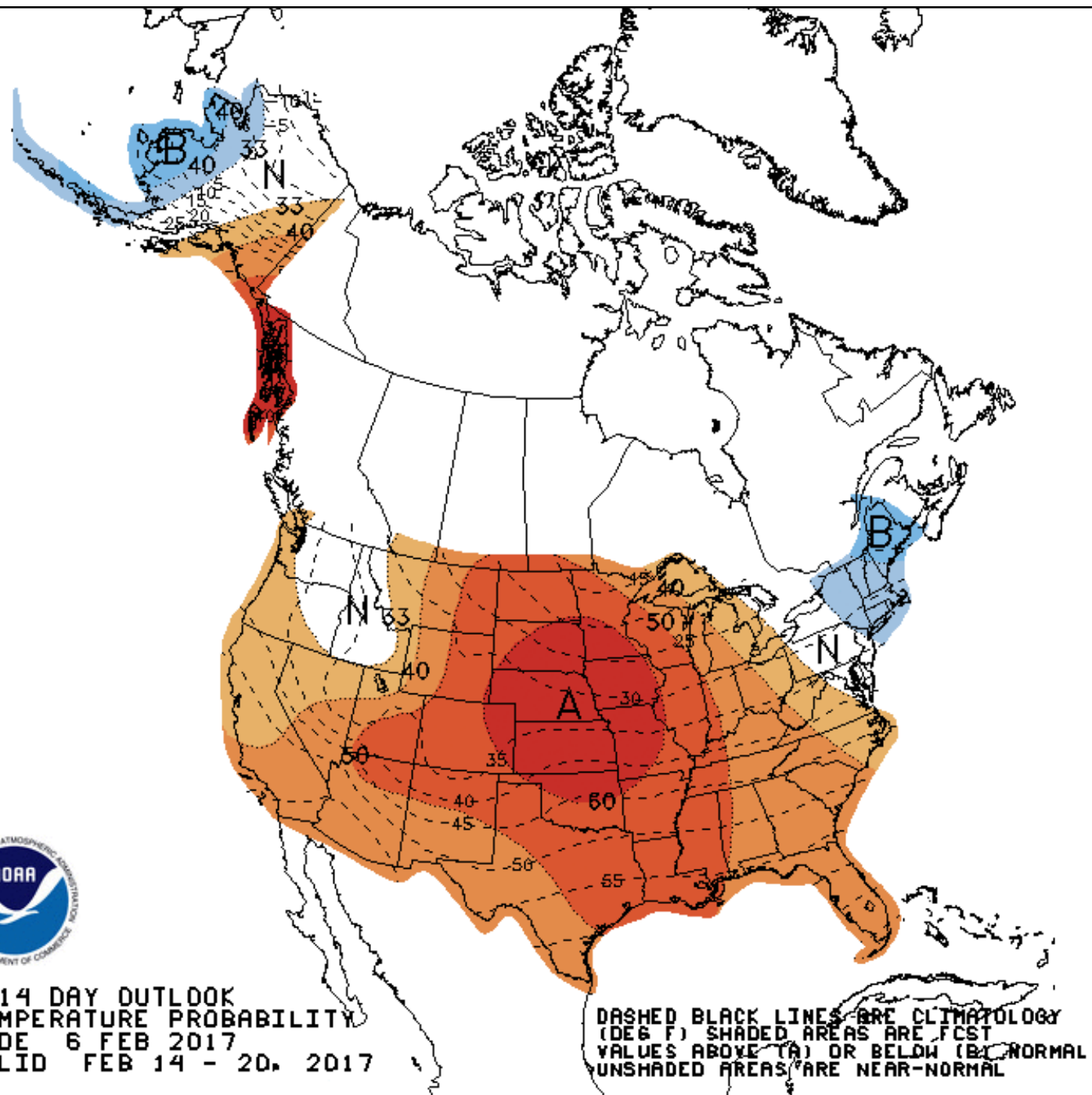
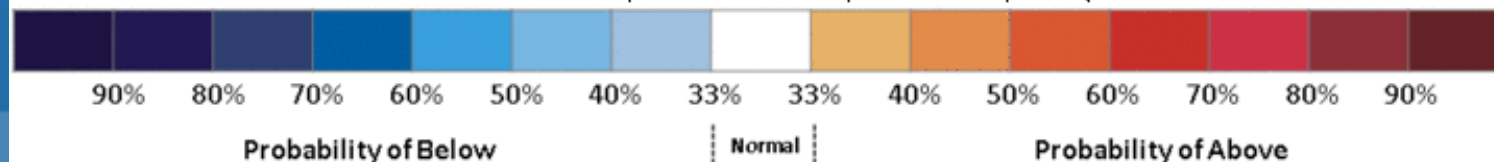
- Awareness of weather & climate trends
- How the body gains and loses heat
- Health effects of cold conditions
- Prevention of cold injury
- Relevant regulations

Short-Term NOAA Forecast

- Provides 8 to 14 Day Outlooks, and longer
- Valid: 2/6/17
- Source: Search terms “NOAA Outlook” or “8 to 14 Day Outlooks”

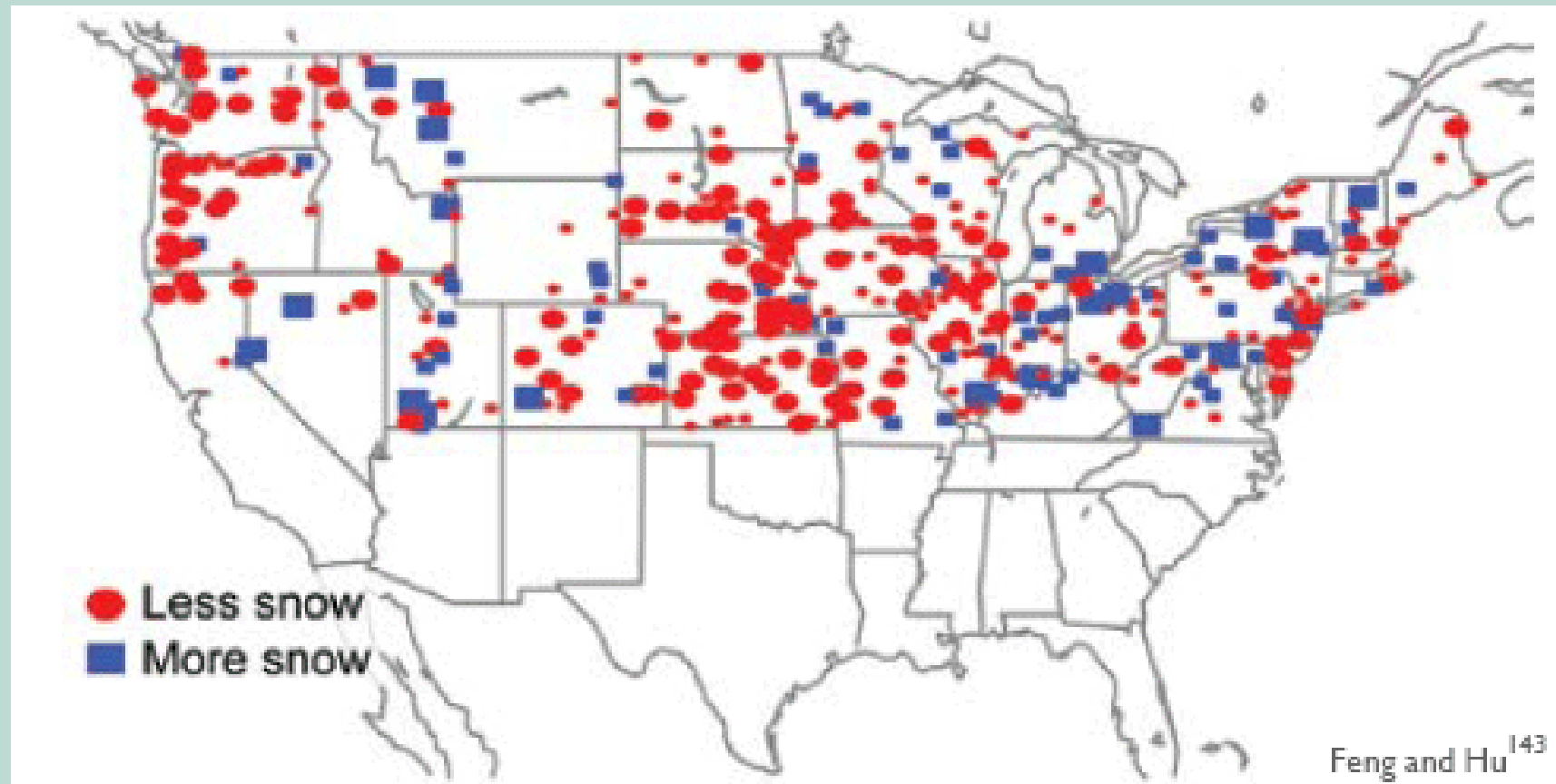


8-14 DAY OUTLOOK
TEMPERATURE PROBABILITY
MADE 6 FEB 2017
VALID FEB 14 - 20, 2017



Longer-Term Weather Trends US

Changes in Snowfall Contributions to Wintertime Precipitation 1949 to 2005



Trends in winter snow-to-total precipitation ratio from 1949 to 2005. Red circles indicate less snow, while blue squares indicate more snow. Large circles and squares indicate the most significant trends.¹⁴³ Areas south of 37°N latitude were excluded from the analysis because most of that area receives little snowfall. White areas above that line have inadequate data for this analysis.

Cold Injury Statistics, NH 2013-16

NH DHHS, Weekly Early Event Detection Report, Week Ending Jan 28, 2017.

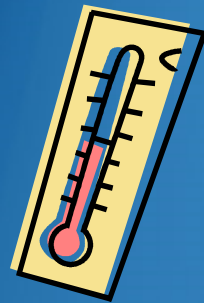
Seasonal Reports

These are emergency department visits reported through AHEDD searching for clinical language associated with heat/cold related injuries and exposure (hyper/hypothermia) and carbon monoxide exposure. The search tool has been validated with ICD-10 codes.

Encounter	Calendar Year	New Detections	Individuals	Clusters
Heat Related				
	2017	0	0	
	2016		105	
	2015		85	
	2014		52	
	2013		122	
Cold Related				
	2017	2	12	
	2016		129	
	2015		152	
	2014		87	
	2013		79	
Carbon Monoxide				
	2017	0	7	2
	2016		70	7
	2015		135	13
	2014		98	11
	2013		95	9

How Conditions Causes Cold

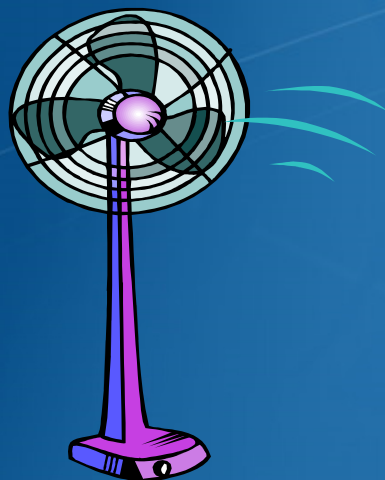
The three main challenges you face from a cold environment include:



Air temperature: what the thermometer reads



Wetness: rain, snow, ice, humidity; sweat; wet clothes; water



Air movement: wind speed (5 mph+); blown air from outdoor wind, indoor fans, chillers in cold rooms, etc.

How the Body Loses Heat

SWEATING:

Heat loss due to perspiration burns calories

WIND EXPOSURE:

Heat loss from wind cools the air next to skin



BREATHING:

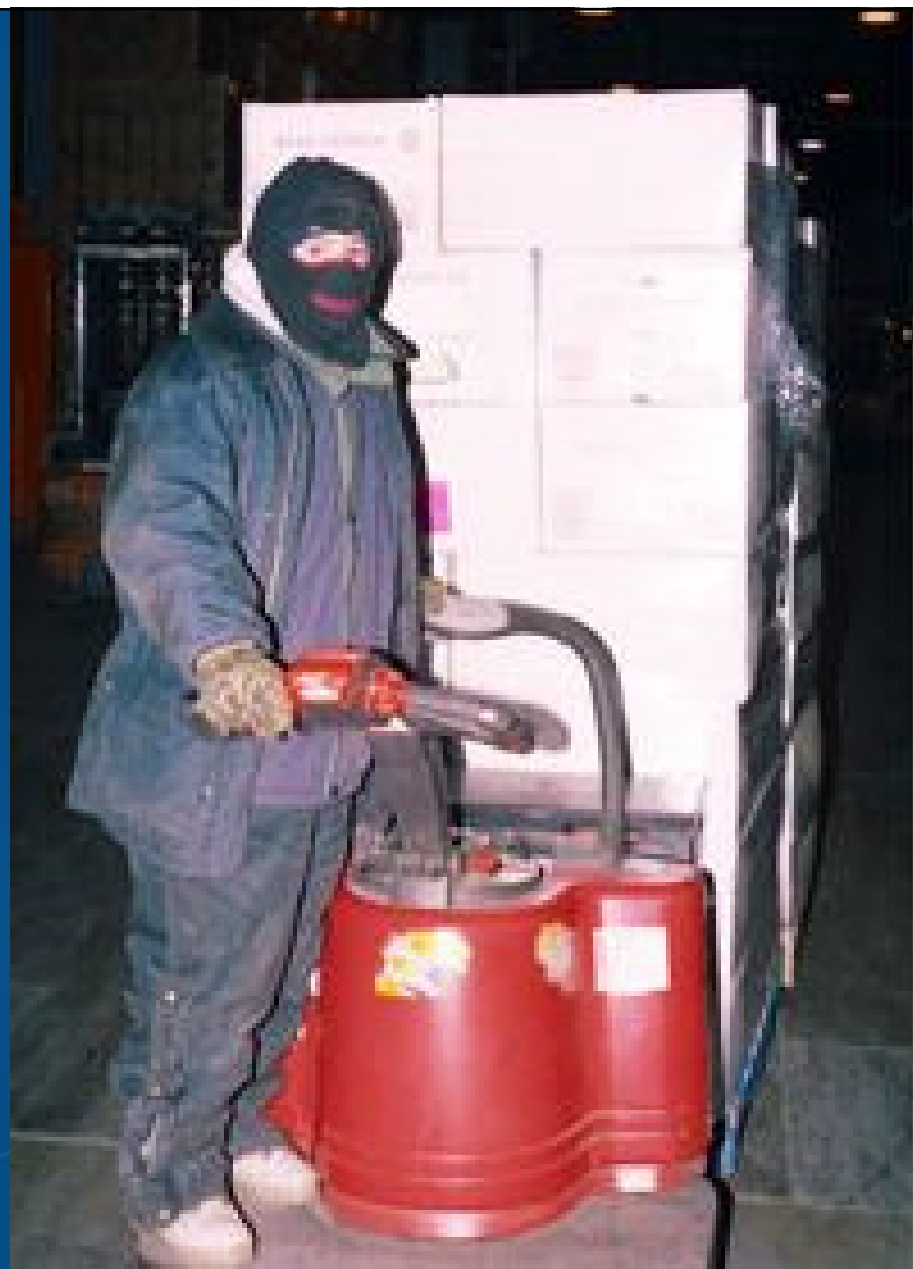
Heat loss from cold air into lungs and warm air out

RADIATION:

Heat loss from exposed skin not reflected back into body

TOUCHING OBJECTS:

Heat loss through contact with a tools or wet materials

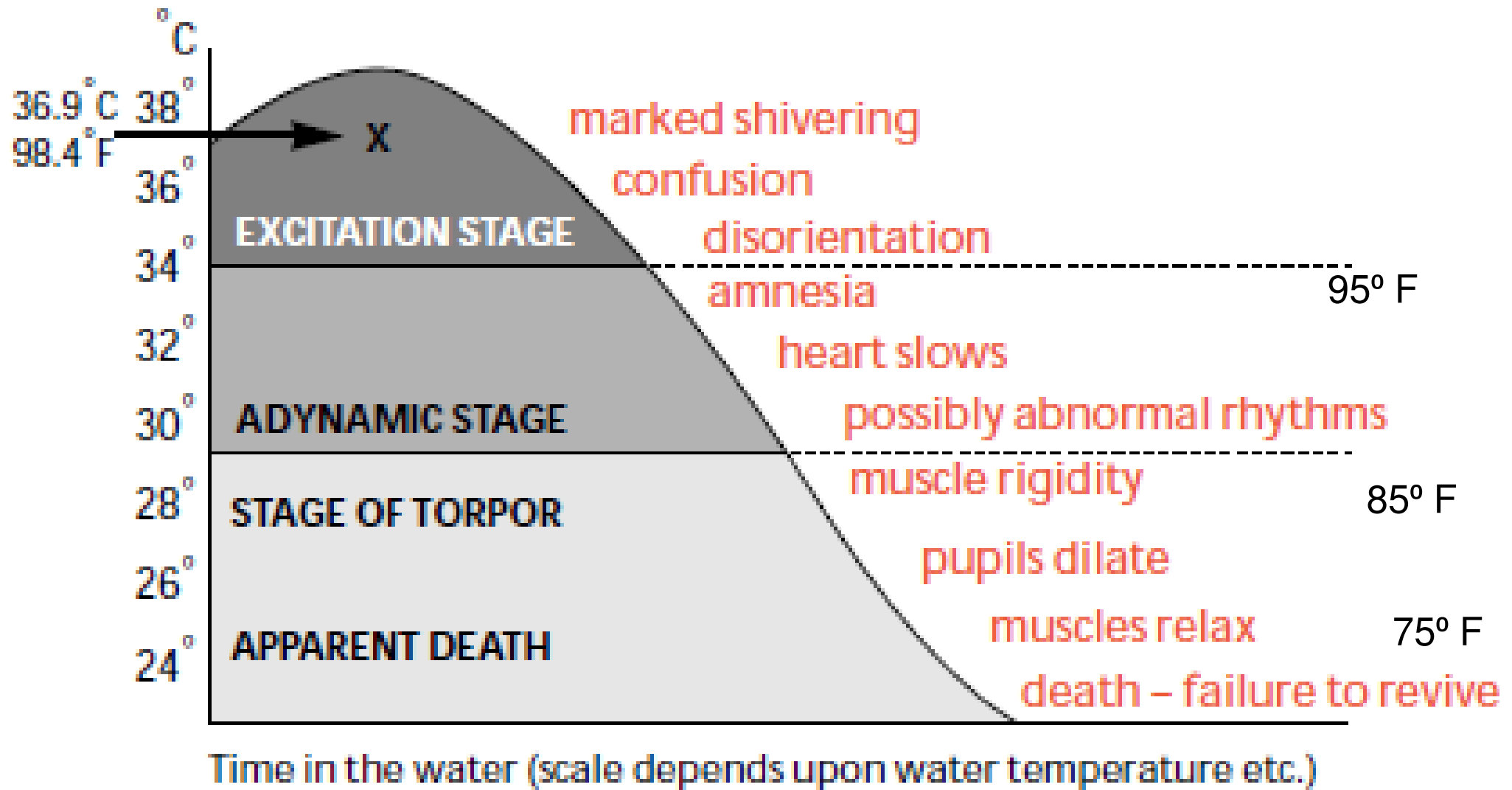


Employee #1 was working in a -10 degrees F freezer. Although he was wearing gloves, they did not provide adequate protection for his hands. The employee was hospitalized for partial amputation of two fingers due to frostbite.

Cold Injury and Related Conditions

Injury/Illness	Cause
Low Core Temp (Hypo-thermia)	Occurs when core body temperature decreases to below 95°F
Deep skin injury (or frostbite)	Ice crystal formation in skin cells, at or below freezing (32°F)
Shallow skin injury (or Frost-nip)	Ice crystal formation only in the very outer layer of the skin
Inflamed skin Injury (or Chilblains)	Mild cold injury due to prolonged exposure to temperatures above freezing (32°F to 60°F)
Immersion skin injury (or Trench foot)	Exposure of wet feet (or hands, other body areas) to cold temperatures above freezing (32°F to 50°F);

Temperature
at the core
of the body





Chilblains

Frostbite



Exposure to freezing conditions at or below <32

Trench Foot



Can occur at temps. as high as 60F if feet are constantly wet

SPOT

FROSTBITE

A victim is often unaware of frostbite because frozen tissue is numb.



Signs & Symptoms

- Redness or pain in any skin area may be the first sign of frostbite.

Other signs include:

- a white or grayish-yellow skin area
- skin that feels unusually firm or waxy
- numbness

HYPOTHERMIA

Hypothermia often occurs at very cold temperatures, but can occur at cool temperatures (above 40°F), if a person is wet (from rain, sweat or cold water) and becomes chilled.



Signs & Symptoms

Adults:

- shivering
- exhaustion
- confusion
- fumbling hands
- memory loss
- slurred speech
- drowsiness

Infants:

- bright red, cold skin
- very low energy



If a person's temperature is below 95° get medical attention immediately.

<http://emergency.cdc.gov/disasters/winter/staysafe/index.asp>



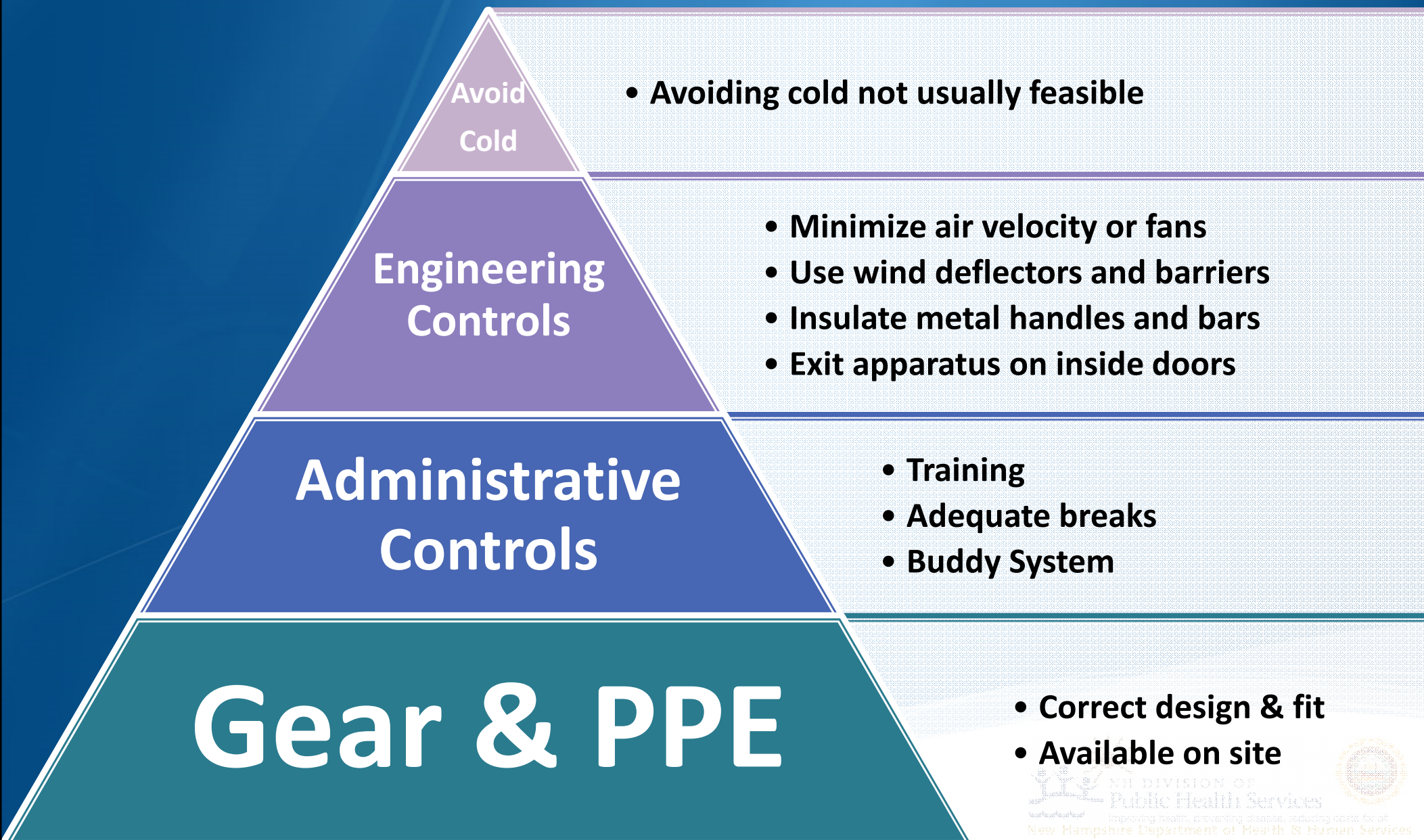
U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

Preventing Cold Injury

Risk Factors for Cold Injury

- Previous cold-related injury
- Poor physical conditioning
- Poor nutrition
- Alcohol use
- Certain health conditions or medications

How to plan for workplace cold?



OSHA General Duty Clause

- OSH Act requires employers to comply with hazard-specific safety and health standards.
- Employers must provide their employees with a workplace free from recognized (cold) hazards likely to cause death or serious physical harm.
- Employers can't substitute Emergency Preparedness Guides or H&S Plans for action on hazards...
- Source: www.osha.gov/SLTC/emergencypreparedness/guides/cold.html

Lab 1400 SAFETY AND HEALTH

- Lab 1403.43 Personal Protective Equipment. The employer shall ensure compliance with the following requirements:
 - (a) The employer shall assess the hazards and provide and require the use of ... PPE...;
 - (b) Where employees furnish their own PPE, the employer shall be responsible to, assure its adequacy and, to ensure that the equipment is properly maintained and in a sanitary condition;
- Source: http://www.gencourt.state.nh.us/rules/state_agencies/lab1400.html

Summary

- Working in extreme temperatures can result in mild or severe cold injury
- Cold conditions can also lead to slips, falls and accidents
- Temperature is important, although changes in wetness and wind speed can increase risk
- Know the symptoms & signs of cold injury
- Plan for the cold, and use workplace controls to find avoid cold injury

For more information:

Matt Cahillane

DHHS Climate and Health Program

603-271-4072; mcahilla@dhhs.state.nh.us

Or visit our website

www.dhhs.nh.gov/dphs/climate/



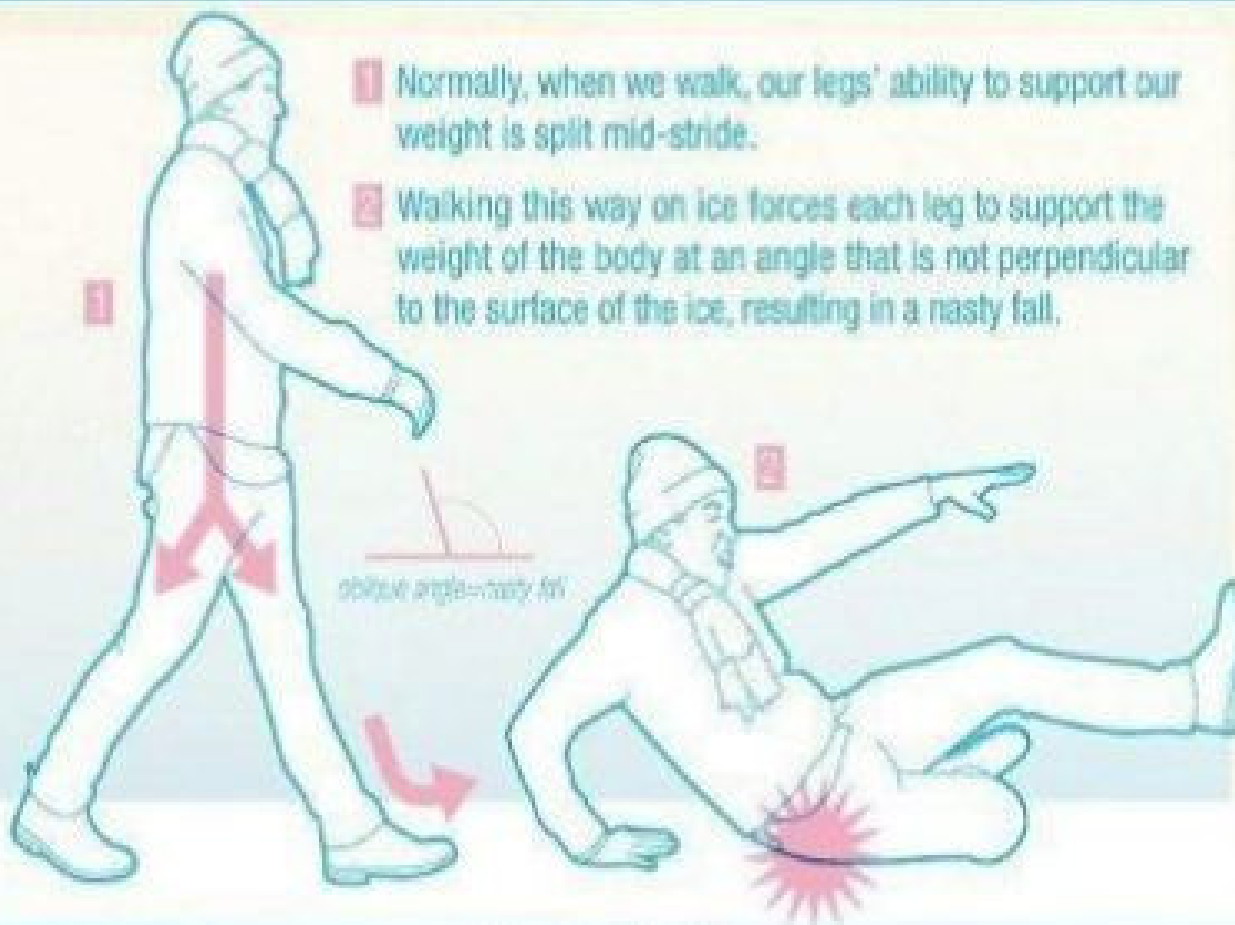
End of slides

Preventing Winter Health Risks

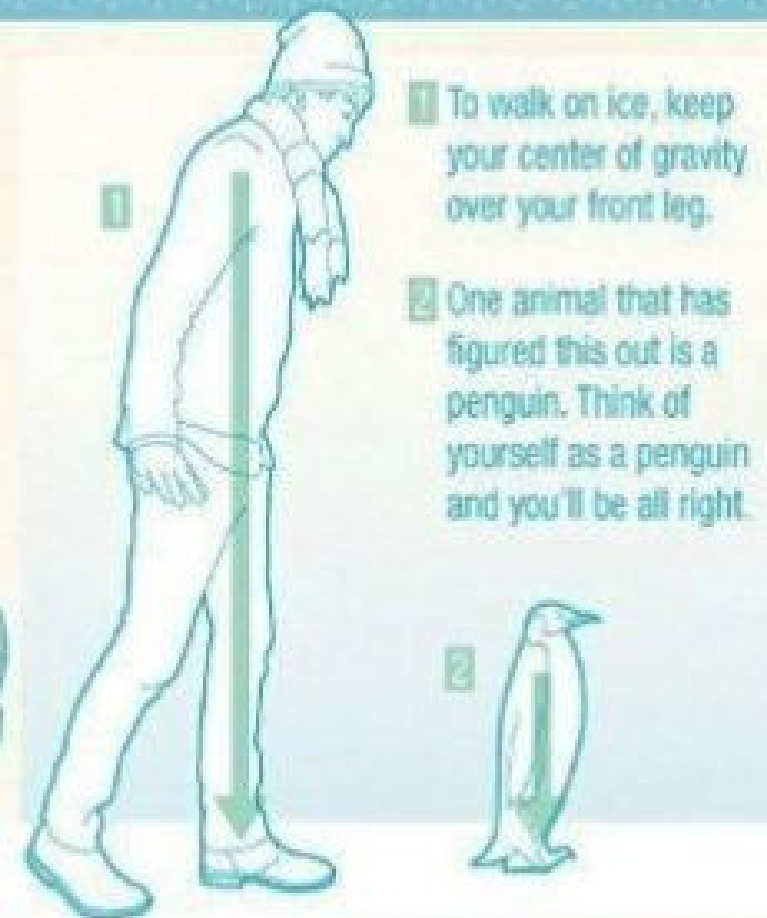
- Head cold – Wash hands & avoid touching nose, eyes, mouth & mucous membranes
- Influenza – Wash hands & avoid sick people with a cough, sneezing or fever
- Vehicle accidents – Drive slower than conditions allow, and increase braking distances.
- Slips and falls on snow/ice – Learn to walk with more weight over your front leg

Slips and Falls on Ice

WINTER LESSONS: HOW TO WALK ON ICE



WRONG WAY



RIGHT WAY



Mild Hypothermia

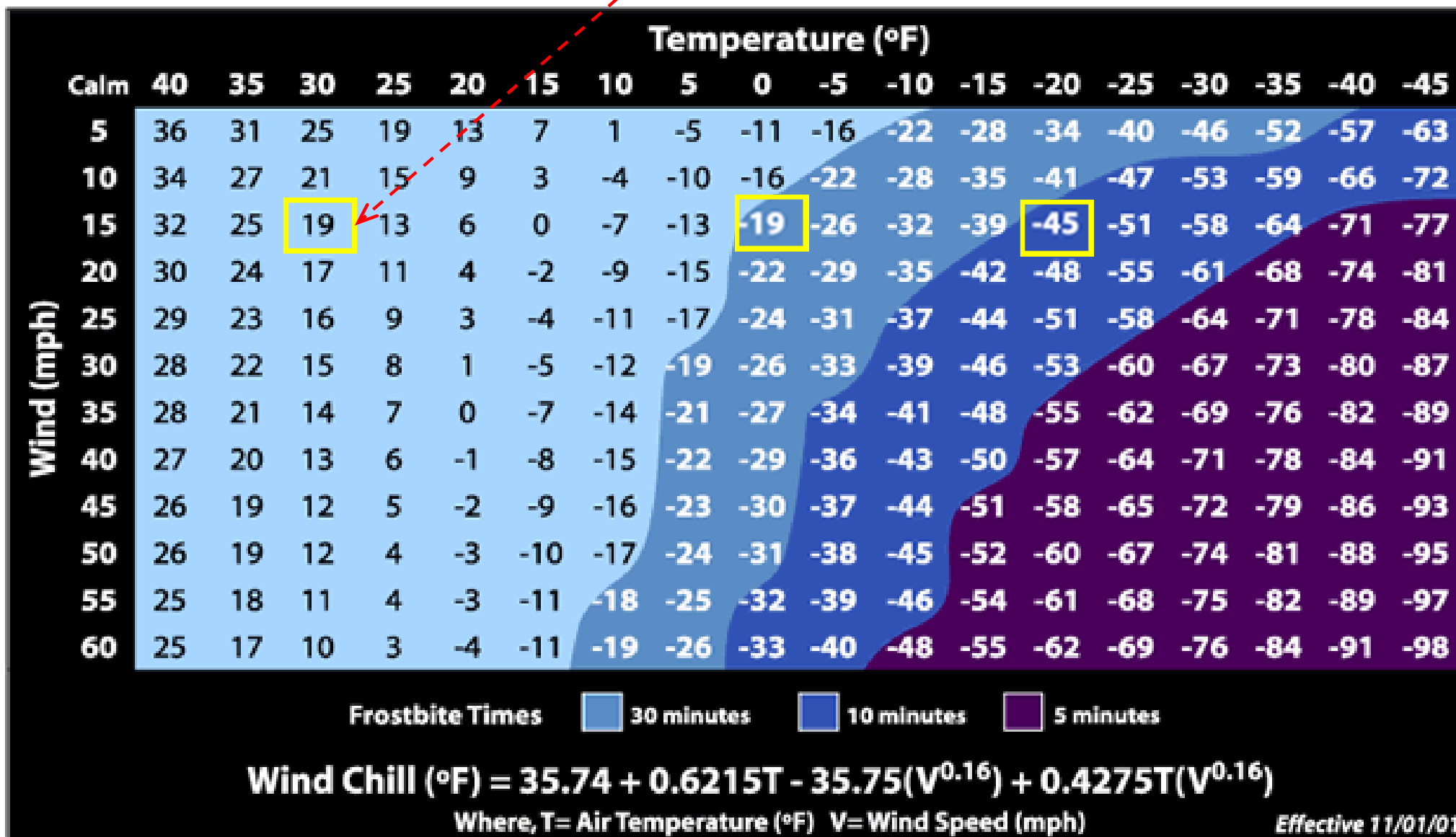


- Shivering present
- Mental Impairment
 - Complex tasks
 - Simple tasks
- Physical Impairment
 - Fine Motor Movements
 - Gross Motor Movements
- Will resolve with minimal intervention with field re-warming techniques

core body temperature below normal or <97

Wind Chill Chart

Example: If the temperature is 30° F and wind speed is 15 mph, it will feel like it's 19° F, If the temps drop to 0 degrees, and the wind speed stays at 15 mph, it will feel like -19 F, and the time for frostbite to occur on exposed skin drops to 30 minutes or less.



http://www.nws.noaa.gov/om/cold/wind_chill.shtml

ACGIH Recommended Guidelines for Rest Breaks

TLVs Work/Warm-up Schedule for Outside Workers based on a Four-Hour Shift*											
Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
	°F (approx)	Max. work Period	No. of Breaks **	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
	-15° to -19°	4 hours = 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
	-20°to -24°	4 hours = 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
	-25°to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease					
	-40°to -44°	30 min.	5	Non-emergency work should cease							
	-45° & below	Non-emergency work should cease									

<http://elcosh.org/document/1284/d000420/cold-stress.html>

Sun Safety Basics

Regina Flynn

Comprehensive Cancer Control Program

February 7, 2017

Regina.flynn@dhhs.nh.gov

Background

- Sun exposure is the same as exposure to Ultra Violet (UV) light which is a type of radiation
- The main source of UV is the sun but you can be exposed in tanning beds and with welding torches
- UV causes sunburn and tanning both of which are damaging to our skin, and can lead to cancer

Sun Safety

- How many of you had a bad sunburn as a child?
- All sun damage adds up
- There is no healthy or base tan
- Sunburns and tanning increase cancer risk

Protect yourself!

- Avoidance
- Clothing and hats
- Sunglasses
- Sunscreen

Avoidance

- When possible avoid the sun from 10 – 4



Cover Up

- Wear long shorts
- Long sleeve shirts
- Wide Brim Hat
- Sunglasses

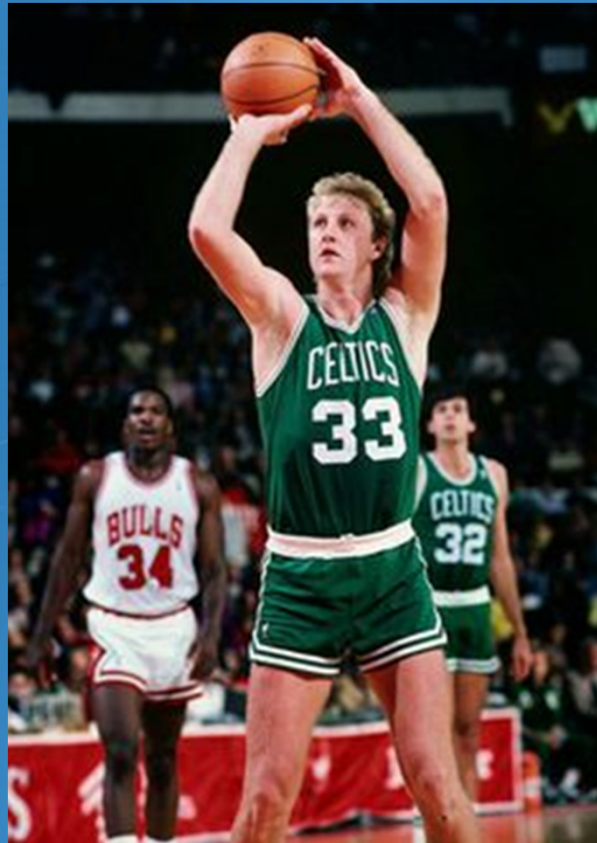
Cover Up

- Wear long shorts



Cover Up

- No short shorts!



Cover Up



Cover Up

- Help cool your body and shade your face and neck



Cover Up

Good Hat



Bad Hat



Sunglasses



Sunglasses

- Only buy sunglasses that block 99% or 100% of UV light and from a known source (not a sidewalk vendor)
- If the tag says “UV absorbing” or “blocks most UV” don’t buy them
- Darker lenses do not mean better protection

Sunglasses

- Protect the areas around the eye and the eyelid from sun damage
- Protect the surface of the eye from burning
- Prevent the development of cataracts

Sunglasses

- Cheaper sunglasses can offer better eye protection over expensive ones (\$10-20)
- Larger frames, wraparound and close fitting styles provide the best protection
- Use in winter (snow glare)



Sunglasses

- Are not required to provide UV protection
- Are required to be shatterproof
- Polycarbonate lenses are 10x more durable than plastic
- Rx



Sun Screen – Chemical and Physical

- Chemical absorbs UV light so it can't penetrate into the skin
- Physical (zinc oxide) stay on top of skin and block UV
- Most contain both chemical and physical
- Sprays – still need to be applied

Sun Screen

- Look for broad spectrum on the label
- SPF 30
- Water resistant means 40-80 minutes after swimming
- No sunscreen is waterproof or sweat proof



Sun Screen

- Use more than you think you need
- Apply on all exposed skin from head to toe
- Nose, above lip, ears, neck, back of hands
- Lip balm with SPF

Sun Screen

- Don't use a combination of sun screen and bug repellent with DEET
- Use separate products and apply as directed
- Keep sunscreen at work so you remember to reapply it

Sun Damage



Wrap Up

- What's the best sunscreen to use?
Remember lip balm!
- SPF 30
- Wear a hat with a brim
- Avoid the sun from 10 am – 4 pm as much as possible

Mosquitoborne Disease and Prevention in NH

Solid Waste Operator Training
February 7, 2017

Abigail Mathewson, DVM, MPH
State Public Health Veterinarian
Division of Public Health Services, DHHS
Infectious Disease Surveillance Section

abigail.mathewson@dhhs.nh.gov
(603) 271-02734

Mosquitoborne Diseases in NH

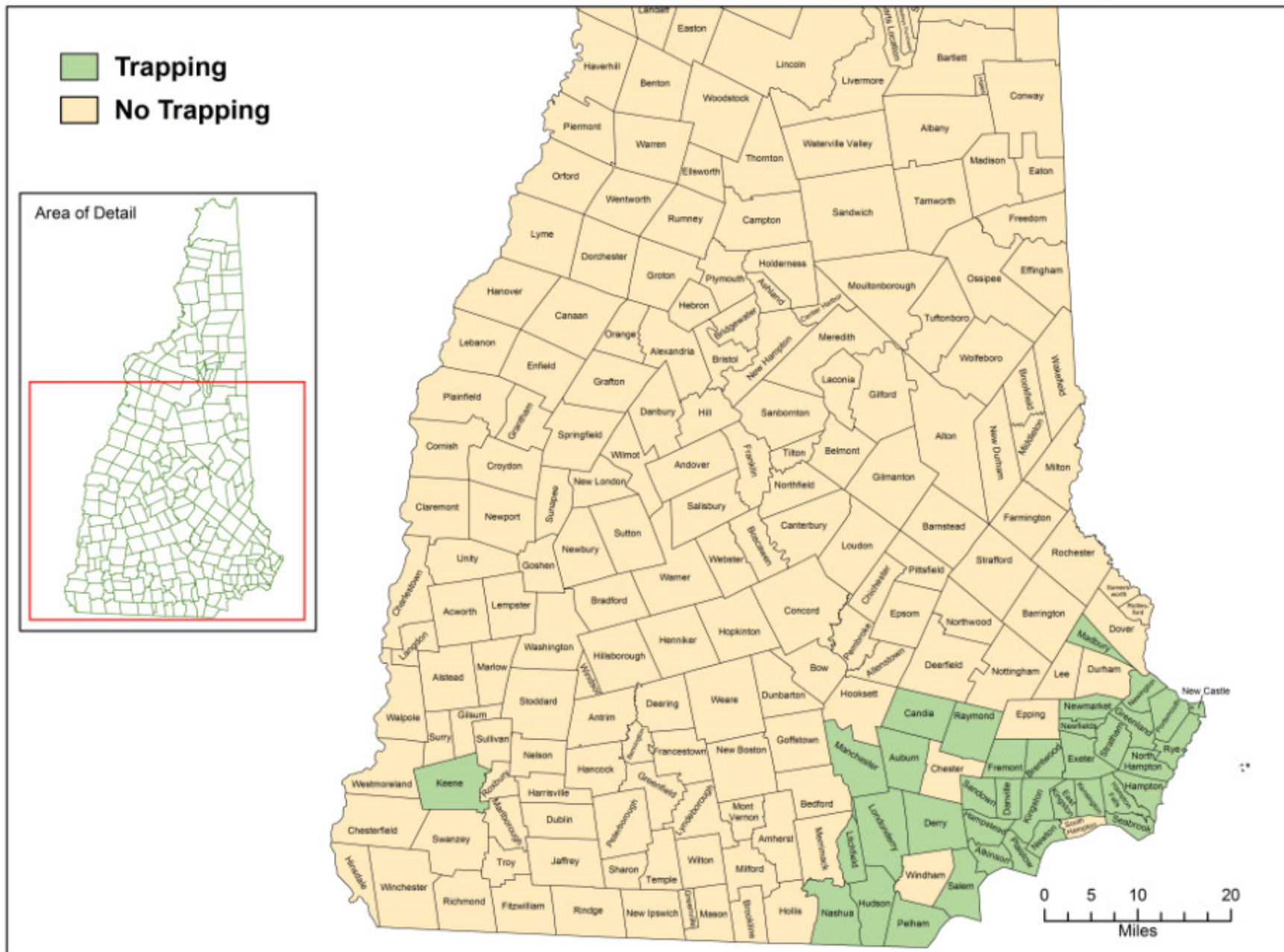
- West Nile Virus (WNV)
- Eastern Equine Encephalitis Virus (EEE)
- Jamestown Canyon Virus (JCV)

NH DHHS Arboviral Surveillance Activities

- Surveillance and control
 - Mosquito
 - Town-based program decisions and financing
 - Human and veterinary
 - Outreach and coordination with healthcare providers (Health Alert Network messaging)
 - Public education and prevention messaging
 - Distribution of surveillance data
 - Test results and risk map updated weekly July-Sept
 - Press releases
- NH Public Health Laboratories testing
 - Mosquito, human, veterinary samples

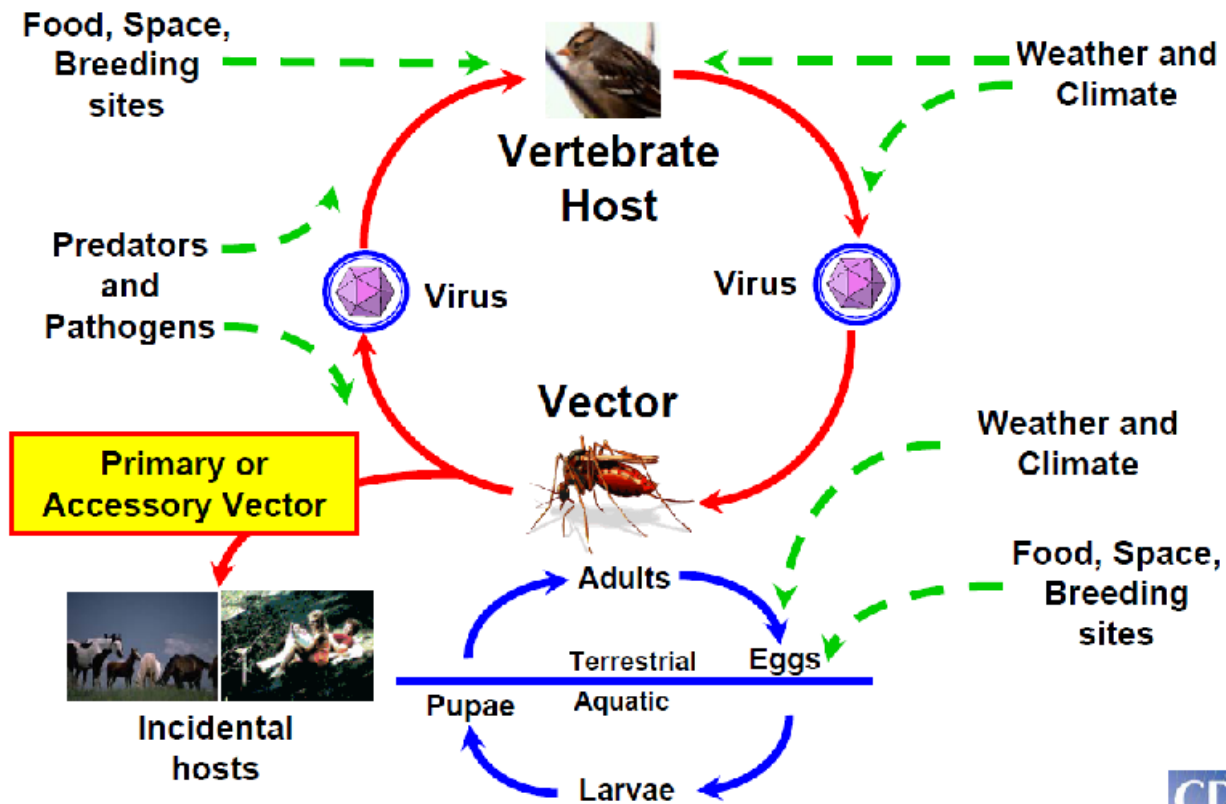
NH Town Sponsored Mosquito Trapping, 2016

New Hampshire Town Sponsored Mosquito Trapping - 2016



Arboviral Basics

Arbovirus Transmission Cycle

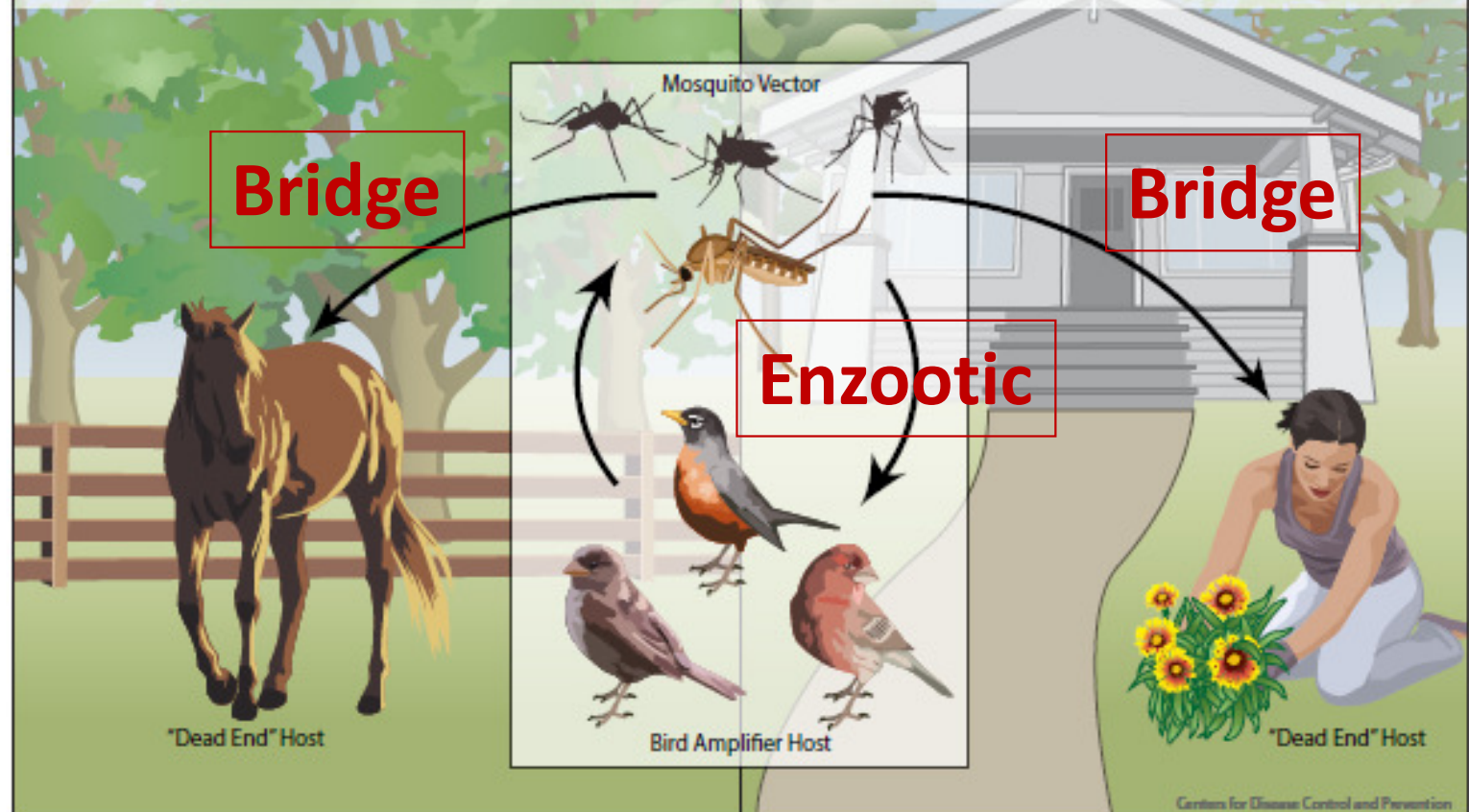


Transmission Cycle – Boiled Down

West Nile Virus Transmission Cycle

In nature, West Nile virus cycles between mosquitoes (especially *Culex* species) and birds. Some infected birds, can develop high levels of the virus in their bloodstream and mosquitoes can become infected by biting these infected birds. After about a week, infected mosquitoes can pass the virus to more birds when they bite.

Mosquitoes with West Nile virus also bite and infect people, horses and other mammals. However, humans, horses and other mammals are 'dead end' hosts. This means that they do not develop high levels of virus in their bloodstream, and cannot pass the virus on to other biting mosquitoes.



WNV/EEE

Aedes

Culex

Coquilleltidia

Culiseta

(we test more
than this)



Public Health Services

Improving health, preventing disease, reducing costs for all

Department of Health & Human Services

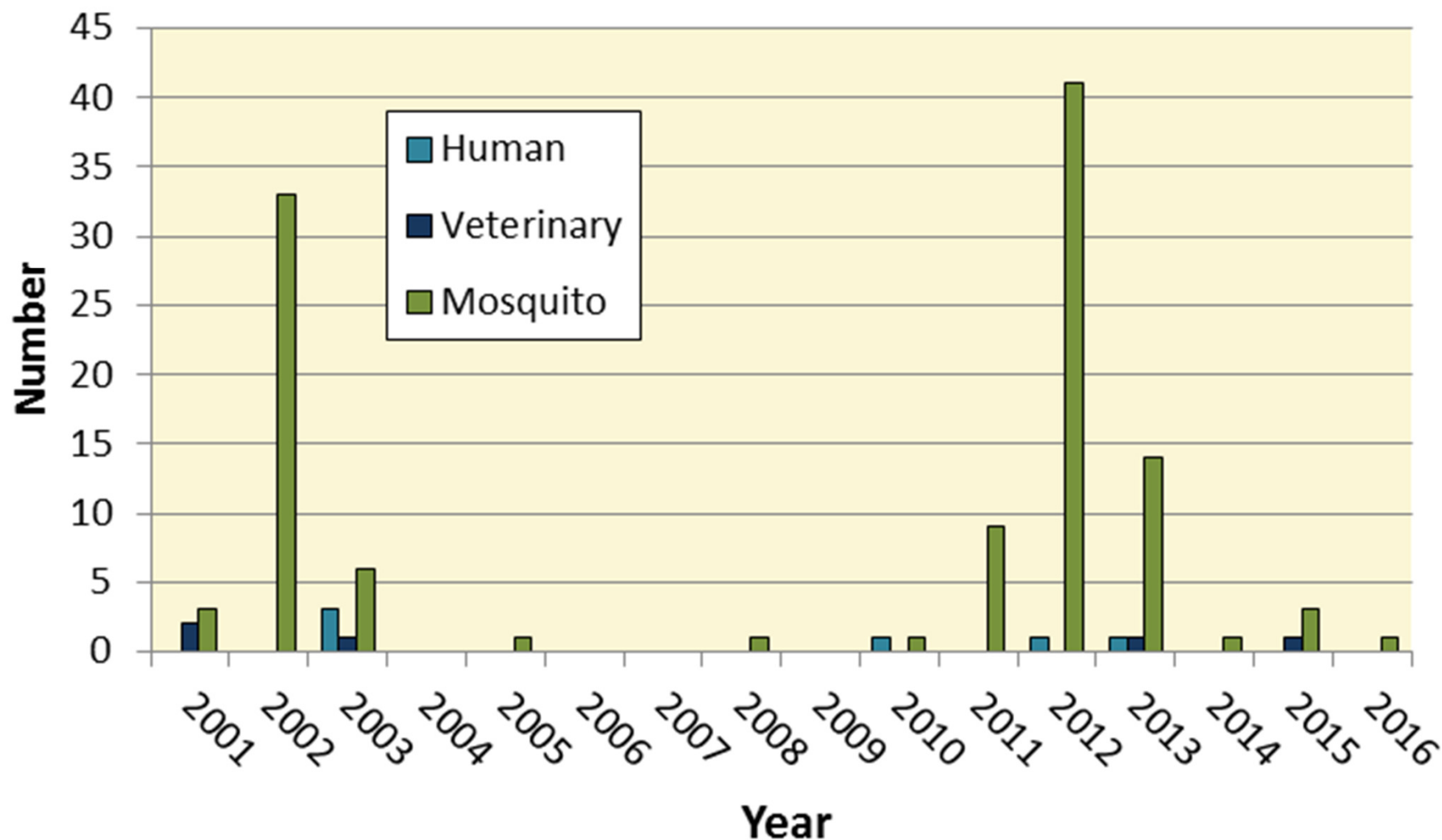


West Nile Virus New Hampshire

West Nile Virus

- 3-14 days after bite from infected mosquito
- “West Nile Fever”
 - About 20% of people infected
 - Fever, headache, body aches, swollen lymph nodes
- WNV Neuroinvasive Disease
 - About 1 in every 150 people infected
 - High fever, headache, neck stiffness, muscle weakness, disorientation, meningitis, encephalitis
- People over 50 years of age are at higher risk of developing serious symptoms

NH WNV Activity: 2001-2016



West Nile Virus - Positive Test Results, 2001 - 2016

Positive Results -



- Human (One or More)



- Wild Bird (One or More)

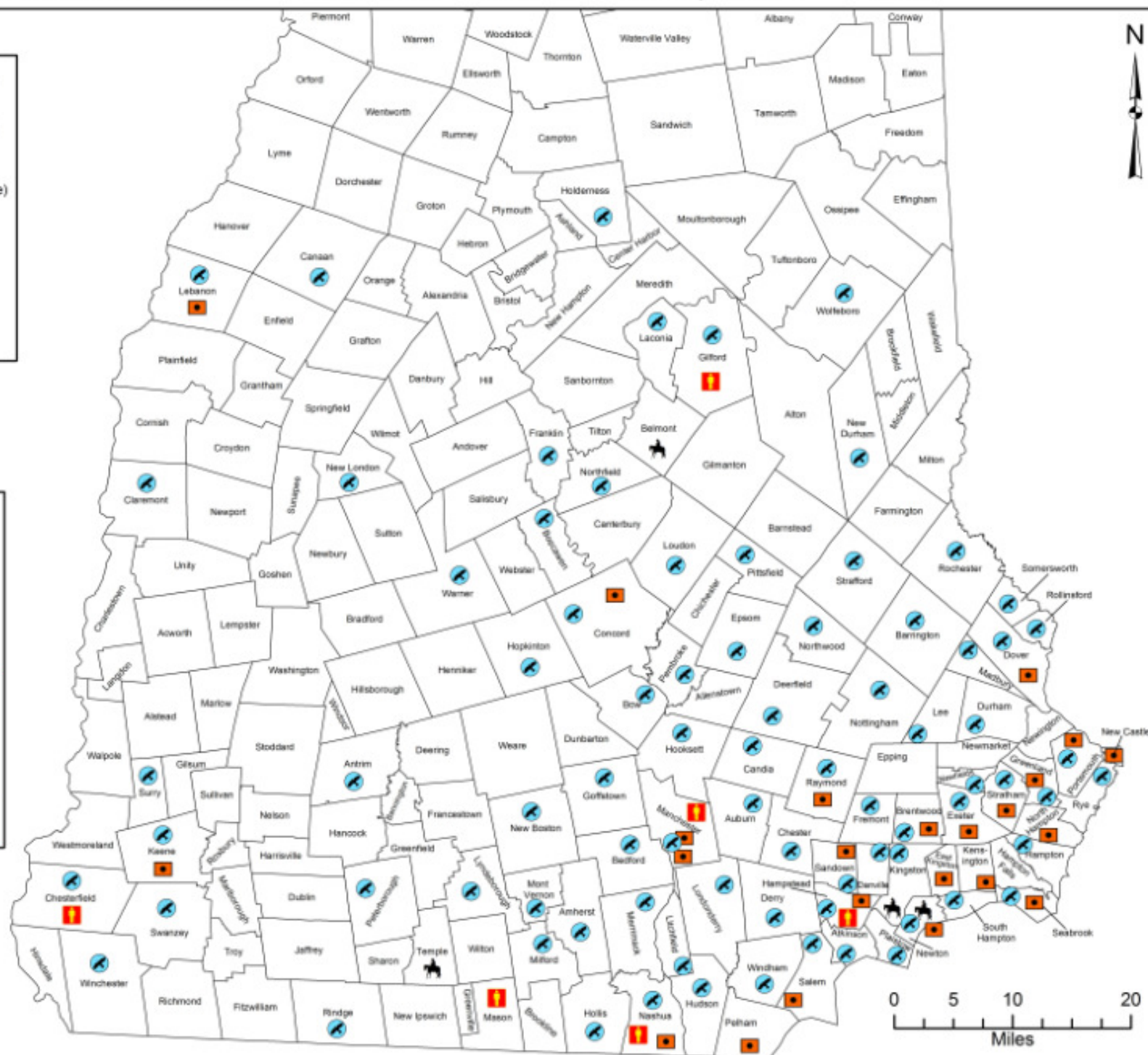


- Mosquito Pool
(One or More)



- Horse (One or More)

Area of Detail



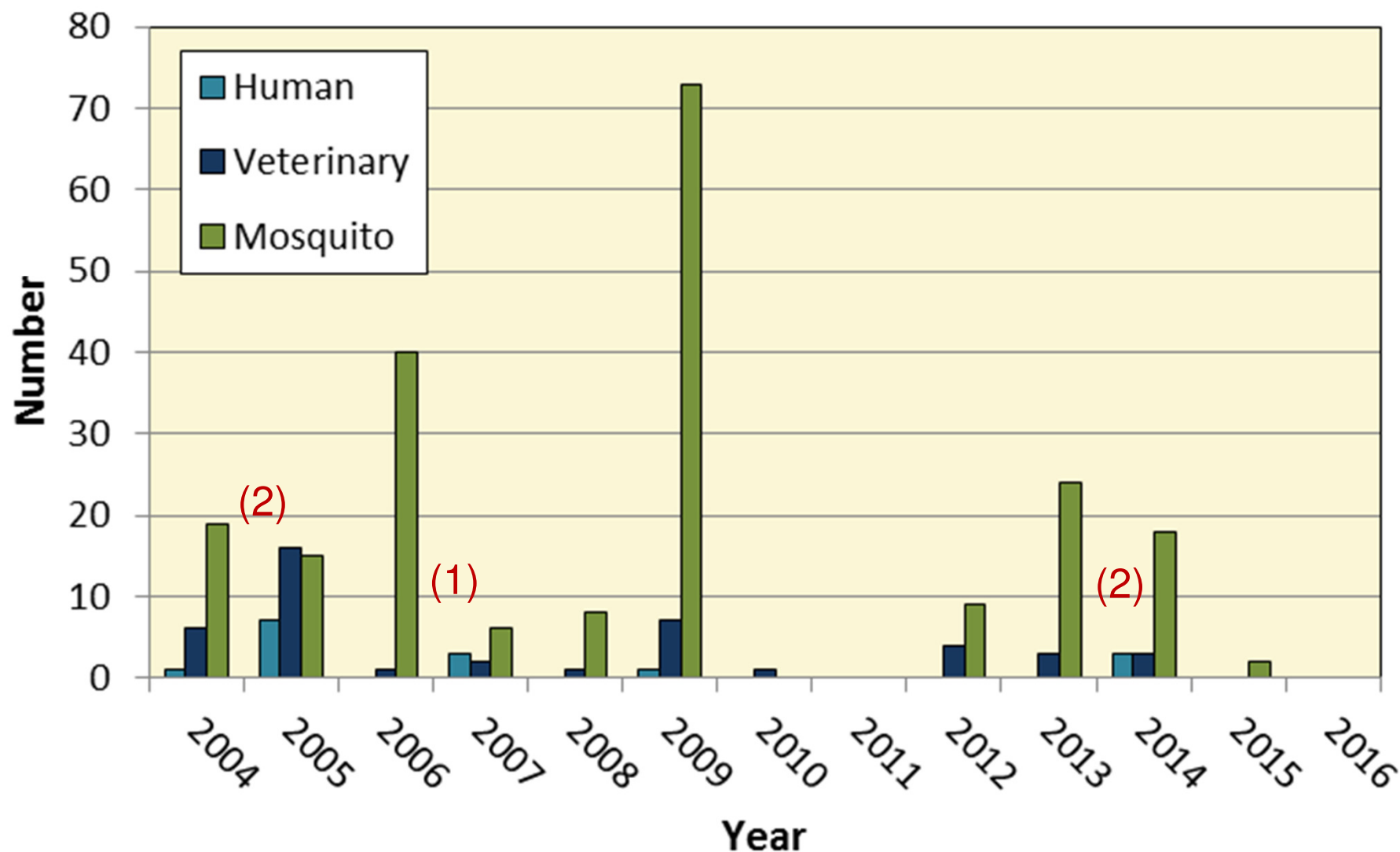
Eastern Equine Encephalitis

New Hampshire

Eastern Equine Encephalitis

- Rare but serious disease
- 4-10 days after bite from infected mosquito
- Severe EEE: Encephalitis
 - Sudden high fever, severe headache, stiff neck, can be followed by seizures, coma
 - Approximately 33% mortality
 - Survivors often suffer long-term to permanent brain damage
- May also appear as milder, flu-like illness
- Persons < 15 and >50 are most at risk for severe disease








NH EEE Activity 2004 - 2016



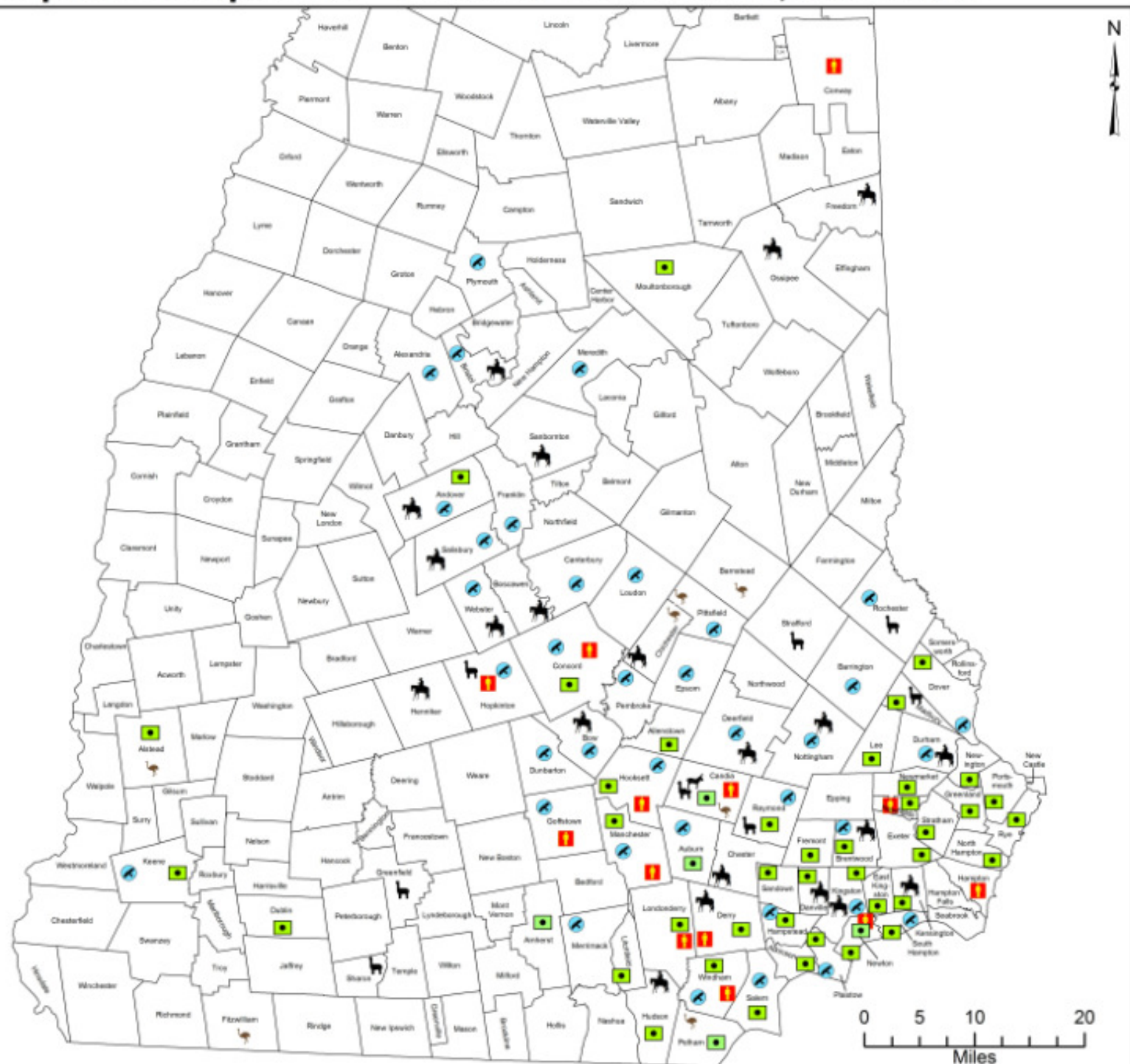
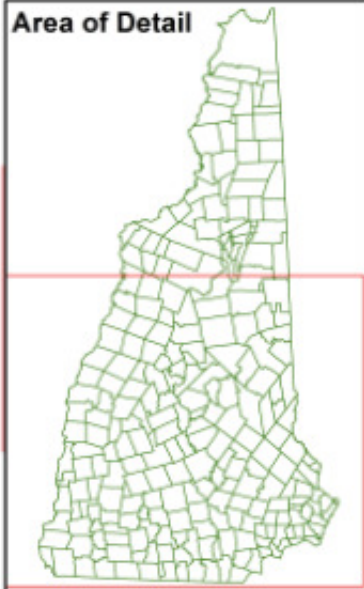
Mosquito Testing initiated in 2004

Eastern Equine Encephalitis – Positive Test Results, 2004-2016

Positive Results -

-  - Human (One or More)
-  - Wild Bird (One or More)
-  - Mosquito Pool (One or More)
-  - Horse (One or More)
-  - Alpaca/Llama (One or More)
-  - Emu (One or More)
-  - Mule (One or More)

Area of Detail



Questions on WNV, EEE, JCV?

Zika Virus

Vectors of Concern

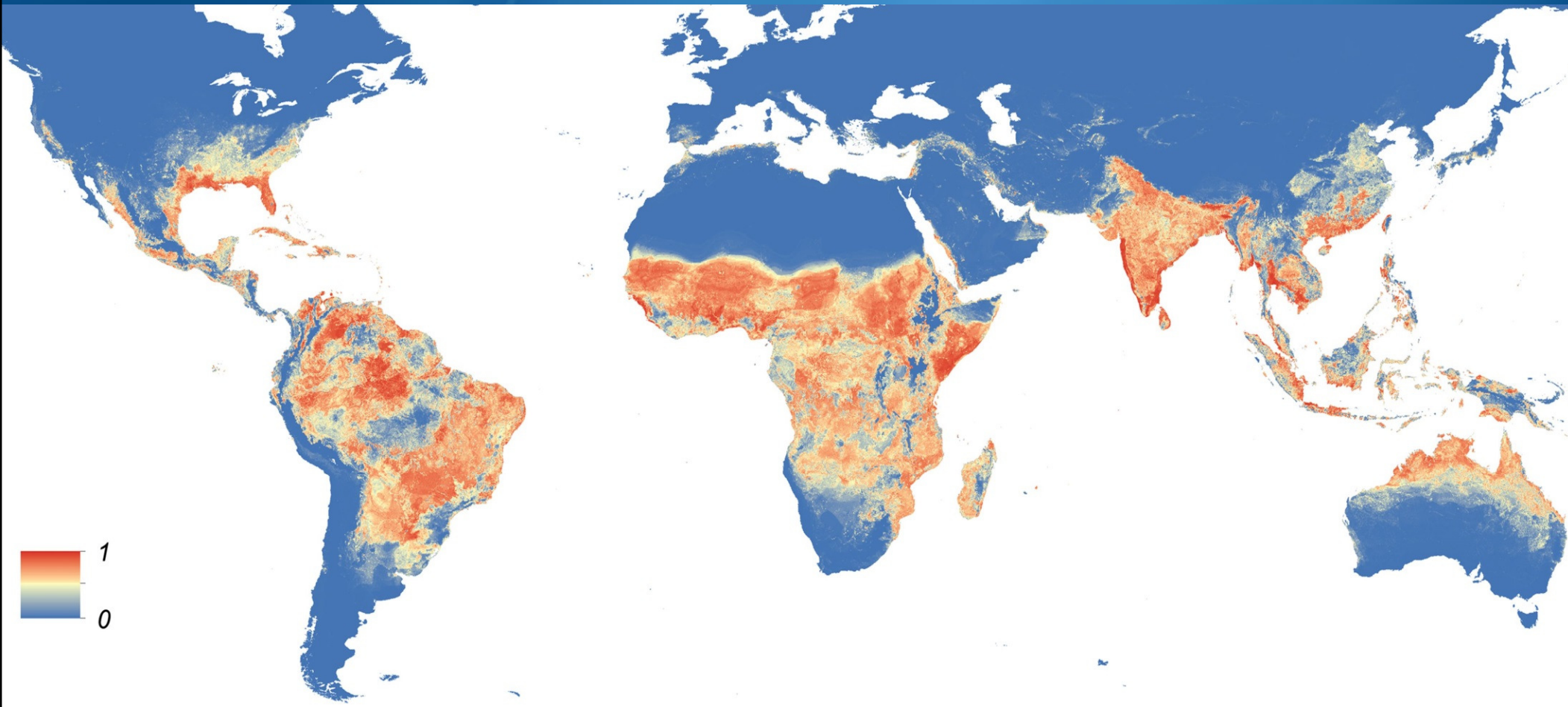
- In the Americas, vectors of concern for Zika are:
 - *Aedes aegypti*
 - *Aedes albopictus*
- They also transmit other viruses
 - Dengue
 - Chikungunya
 - Yellow Fever
 - EEE (*Ae. albopictus*)

Other Potential Vectors

- Currently unknown, but is possible
- Research is ongoing
 - *Culex pipiens*
 - *Aedes triseriatus*
 - *Aedes vexans*

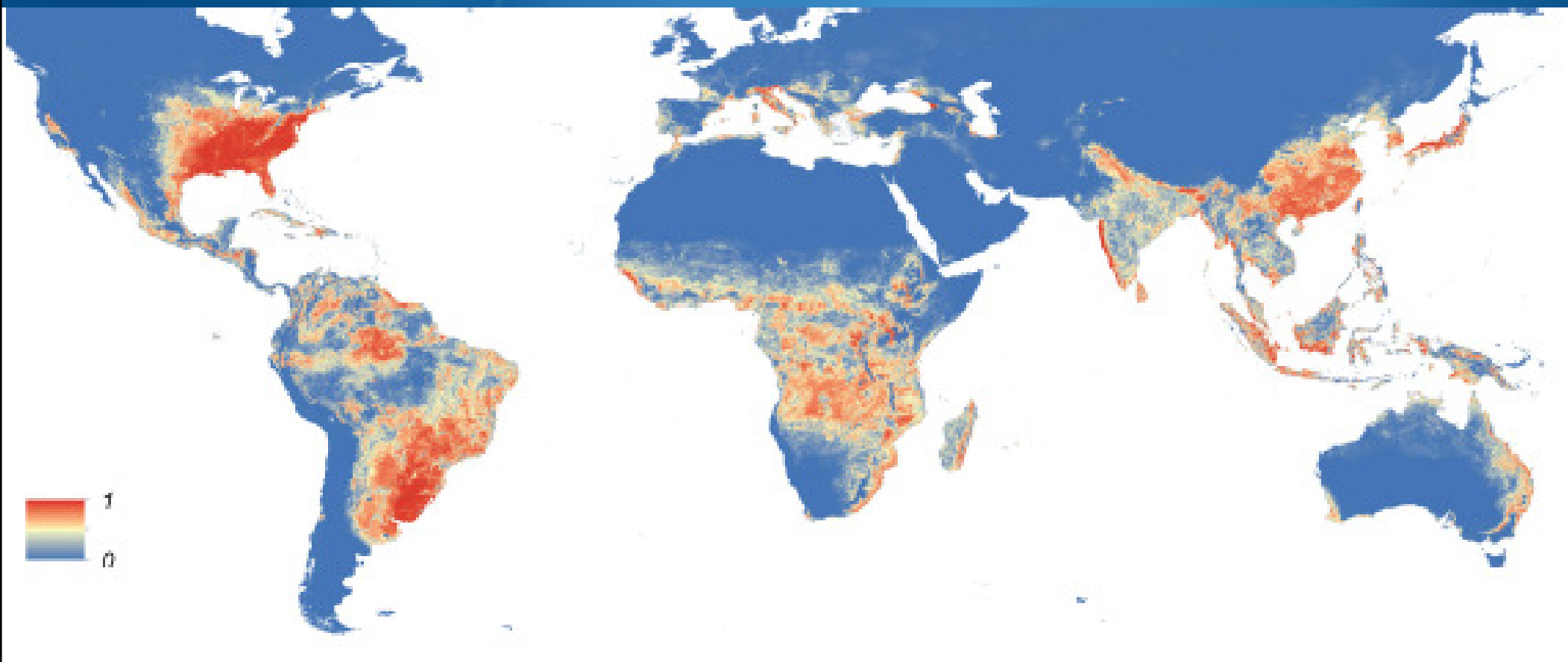


Predicted Global Distribution of *Aedes aegypti*



Kraemer et al 2015

Predicted Global Distribution of *Aedes albopictus*

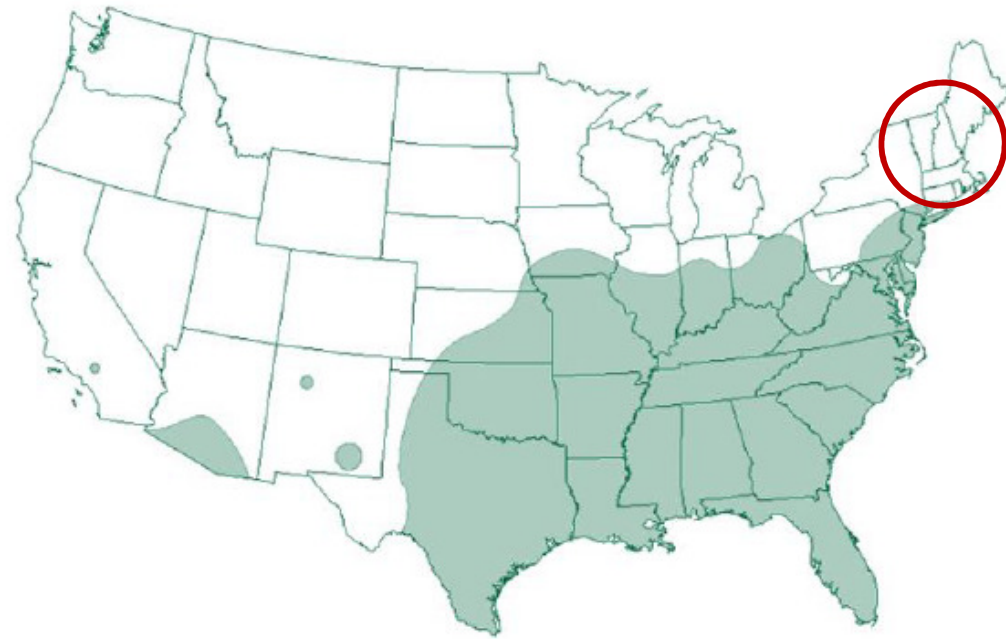


Kraemer et al 2015

Pre-2016 Geographic Distribution Estimates



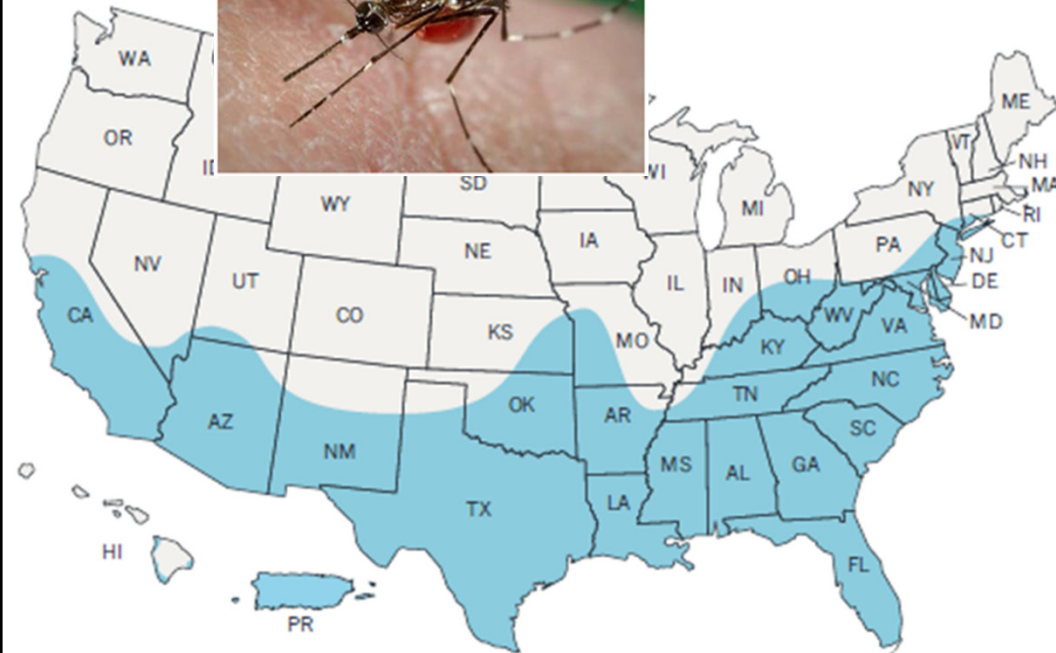
Aedes aegypti



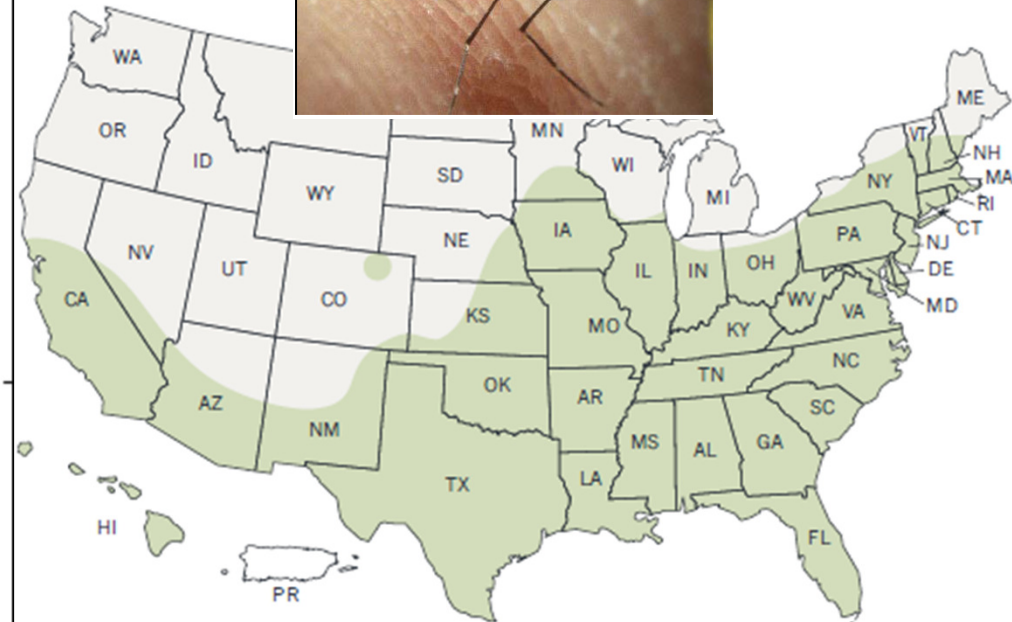
Aedes albopictus

CDC Ingrid Rabe

Current Estimated Range in US



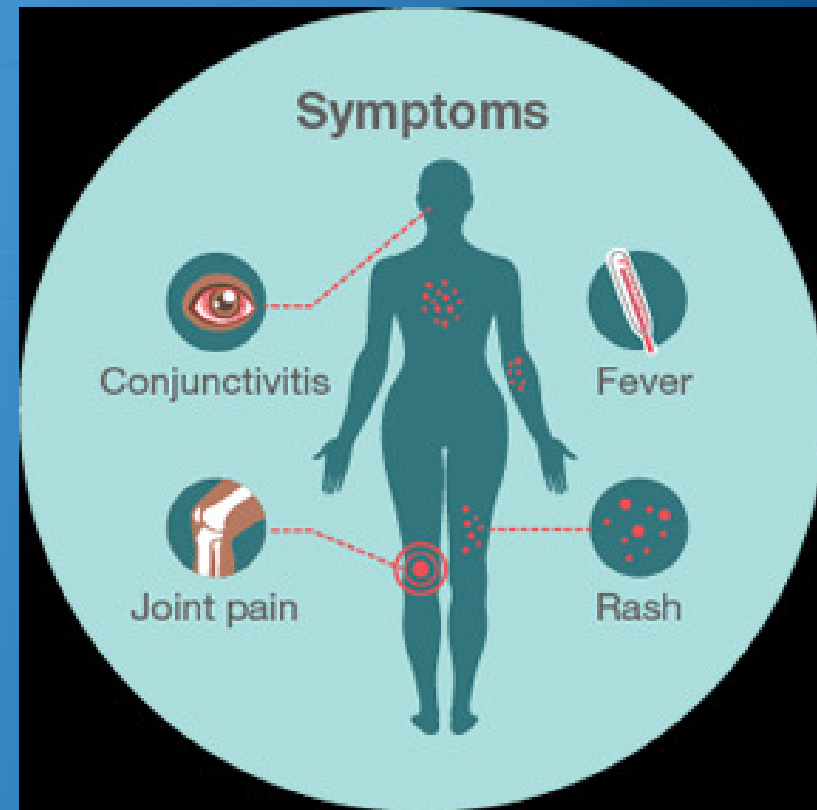
Aedes aegypti



Aedes albopictus

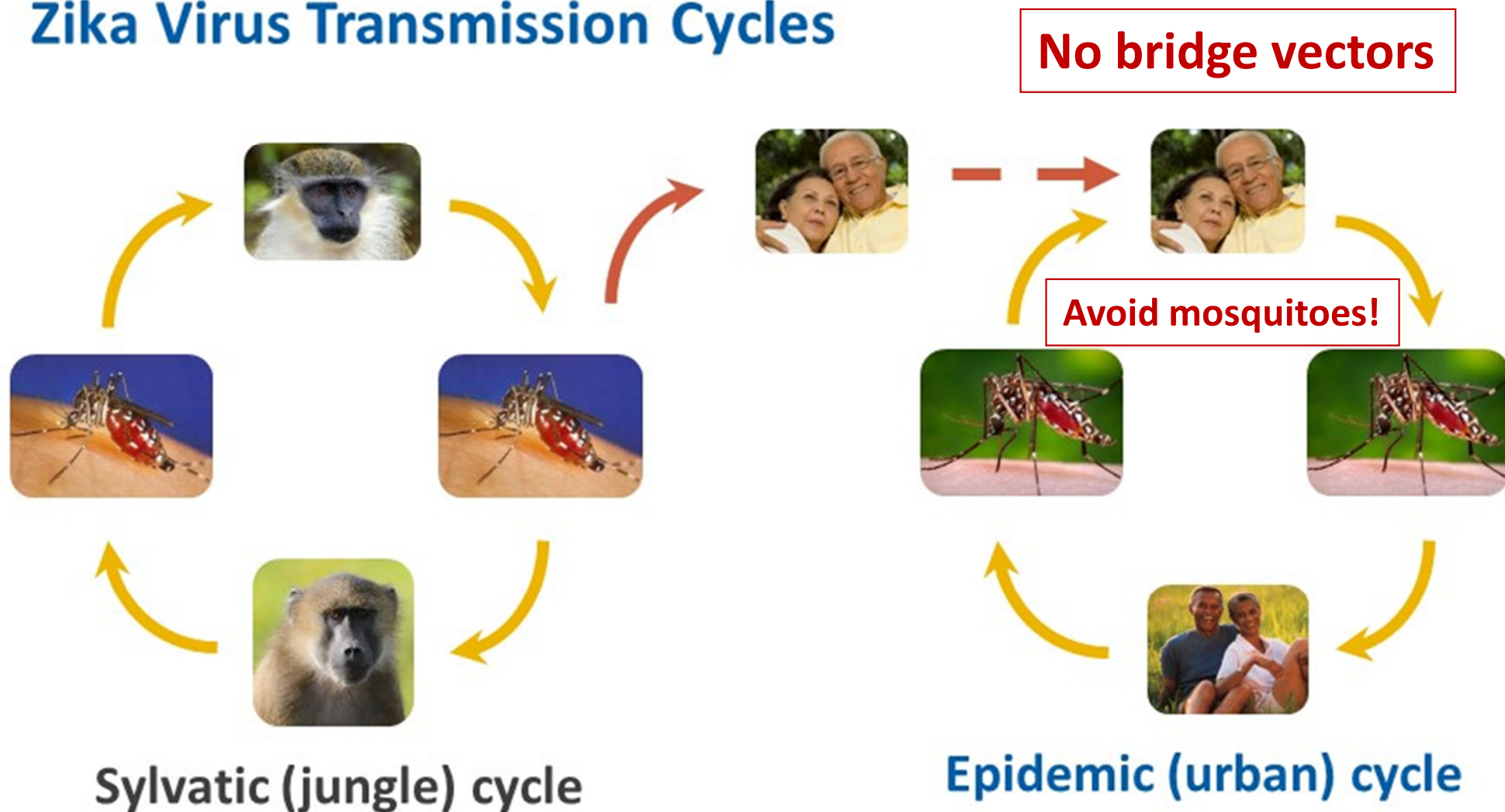
Overview of Zika virus infection

- Flavivirus (family *Flaviviridae*)
- Related to other Flaviviruses: WNV, Dengue, Yellow Fever
- Transmission is mainly through mosquitoes



'Simple' Transmission Cycle

Zika Virus Transmission Cycles



Overview of Zika virus infection

- Virus transmitted primarily by the bite of an infected *Aedes* mosquito
 - Predominantly *Aedes aegypti*, also *Aedes albopictus* in the Americas
- Virus now known to also be sexually transmitted as well as transmitted during the perinatal period from mother to child
- Two lineages
 - African lineage
 - Asian lineage – current outbreak

History

Origins of Zika

- 1947: Identified in the Ziika Forest of Uganda by scientists performing surveillance for yellow fever in Rhesus monkeys
- 1948: Zika virus isolated from *Aedes africanus* mosquitos in Uganda
- 1952: Antibodies first identified in populations in Uganda and Tanzania
- 1954: Zika virus isolated from a girl in Nigeria with fever and headache



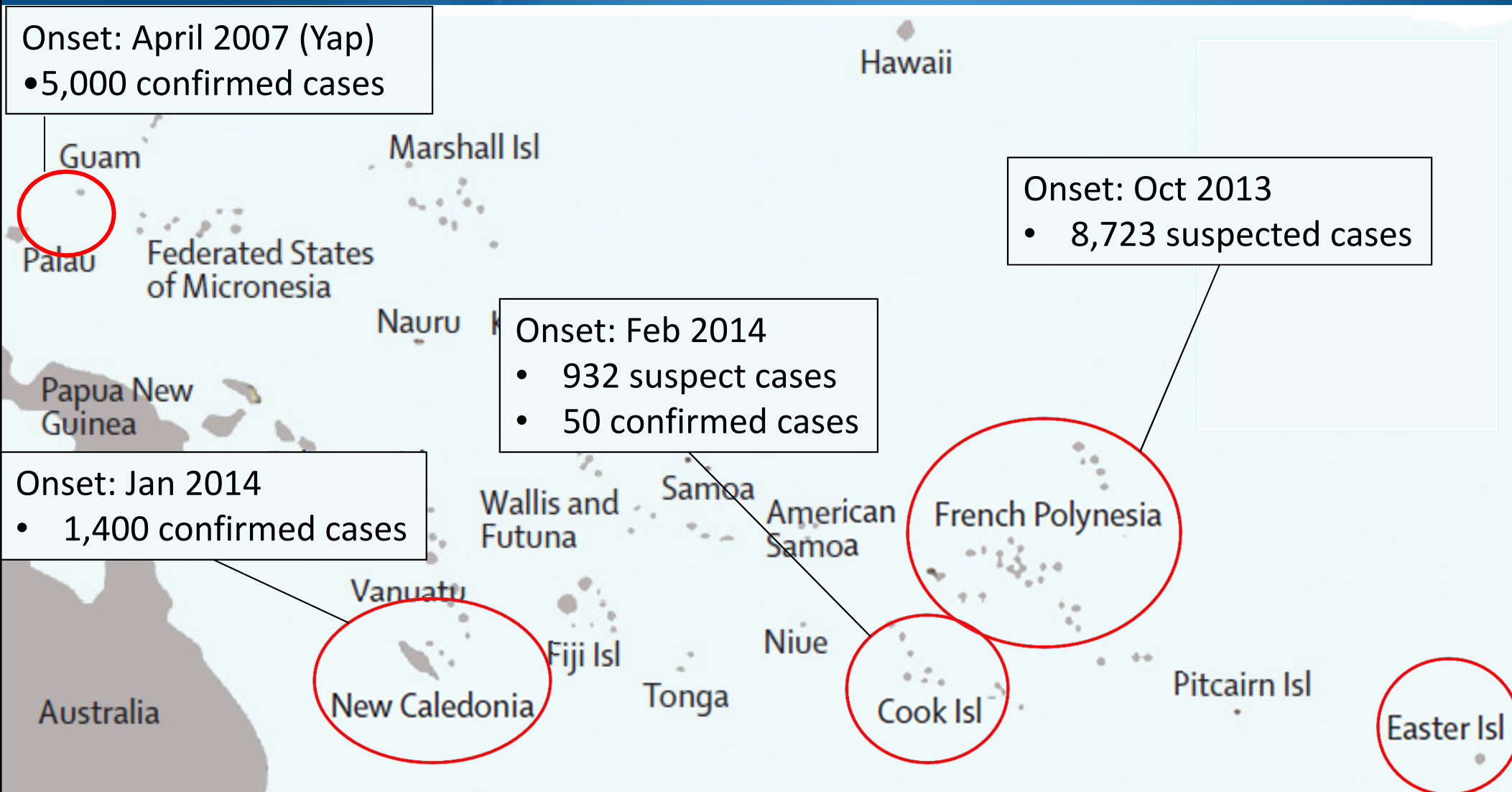
Zika Was Not Thought to Cause Significant Clinical Disease

- 1954: 1st case of reported illness¹
 - 10 year old Nigerian female who presented with fever and headache
- 1962-1963: 2nd case of reported illness²
 - 28 year old European male working in Ziika Forest presented with frontal headache, diffuse maculopapular rash, low-grade fever, malaise, & back pain
 - Symptoms resolved by day 5 of illness

¹ Macnamara FN. Trans R Soc Trop Med Hyg 1954;48(2):139-145

² Simpson DIH. Trans R Soc Trop Med Hyg 1964;58(4):334-8

South Pacific Zika Outbreak



Current Outbreak

First Identification of Zika in Northeastern Brazil

- Early 2015 in Natal, Brazil : patients presenting with a “dengue-like syndrome”
 - Fever, maculopapular rash, conjunctivitis, arthralgias, headache, myalgias, retroorbital pain
- March 2015: 8 cases of Zika confirmed by PCR
- Analysis showed virus of Asian lineage

Current Outbreak - Timeline

- May 2015: Confirmed transmission in Brazil
 - Thought to have arrived via FIFA World Cup in Aug 2014
- Brazil heavily impacted
 - July 2015: Neurological disorders (Guillain-Barre syndrome) were noted
 - October 2015: Association with microcephaly noted
 - November 2015: National public health emergency declared
 - November 2015: First ever deaths were noted (2 among adults and one infected newborn)
- February 2016: Sexual transmission reported in the U.S.
- July 2016: First documented cases of local transmission in the U.S

Brazil Ministry of Health (MOH) Reports Increases in GBS and Microcephaly

- July 2015: 42 patients with GBS
 - 62% reported symptoms consistent with Zika
- October 2015: increase in congenital microcephaly in northeast Brazil
 - 2000: 5.5 cases/100,000 live births
 - 2010: 5.7 cases/100,000 live births
 - Jan-Nov 2015: 99.7/100,000 live births (20-fold increase)
- Nov 2015: Brazil establishes a microcephaly surveillance system

Public Health Emergency of International Concern

- The World Health Organization declared a PHEIC February of 2016 as a result of the identification of increased microcephaly and other neurological birth defects as well as Guillain-Barre syndrome in association with the Zika outbreak
- By April 2016, literature had been published demonstrating a causal relationship between infection with Zika and these birth defects (Rasmussen et al NEJM)



Symptoms of Zika Virus

- Incubation ~3-12 days after bite
- 60-80% of infections asymptomatic
- Symptoms usually mild
 - Self-limiting febrile illness of 4–7 days duration
 - Acute fever, maculopapular rash, conjunctivitis, joint / muscle pain, and headache



Symptoms of Zika Virus – Severe Manifestations

- Severe manifestations:
 - Guillain-Barré syndrome
 - Post infectious process that develops rapidly over hours or days – symmetric paralysis, cardiac dysregulation, respiratory insufficiency
 - Microcephaly and other neurological, ocular and musculoskeletal birth defects in babies with mothers infected during pregnancy

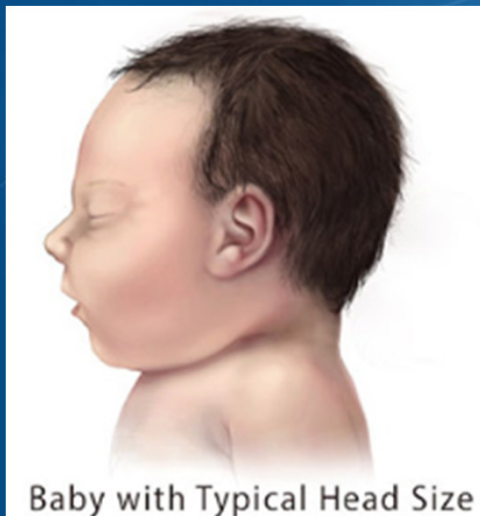


Image source: CDC

Change in Zika Distribution Previous 10 Years

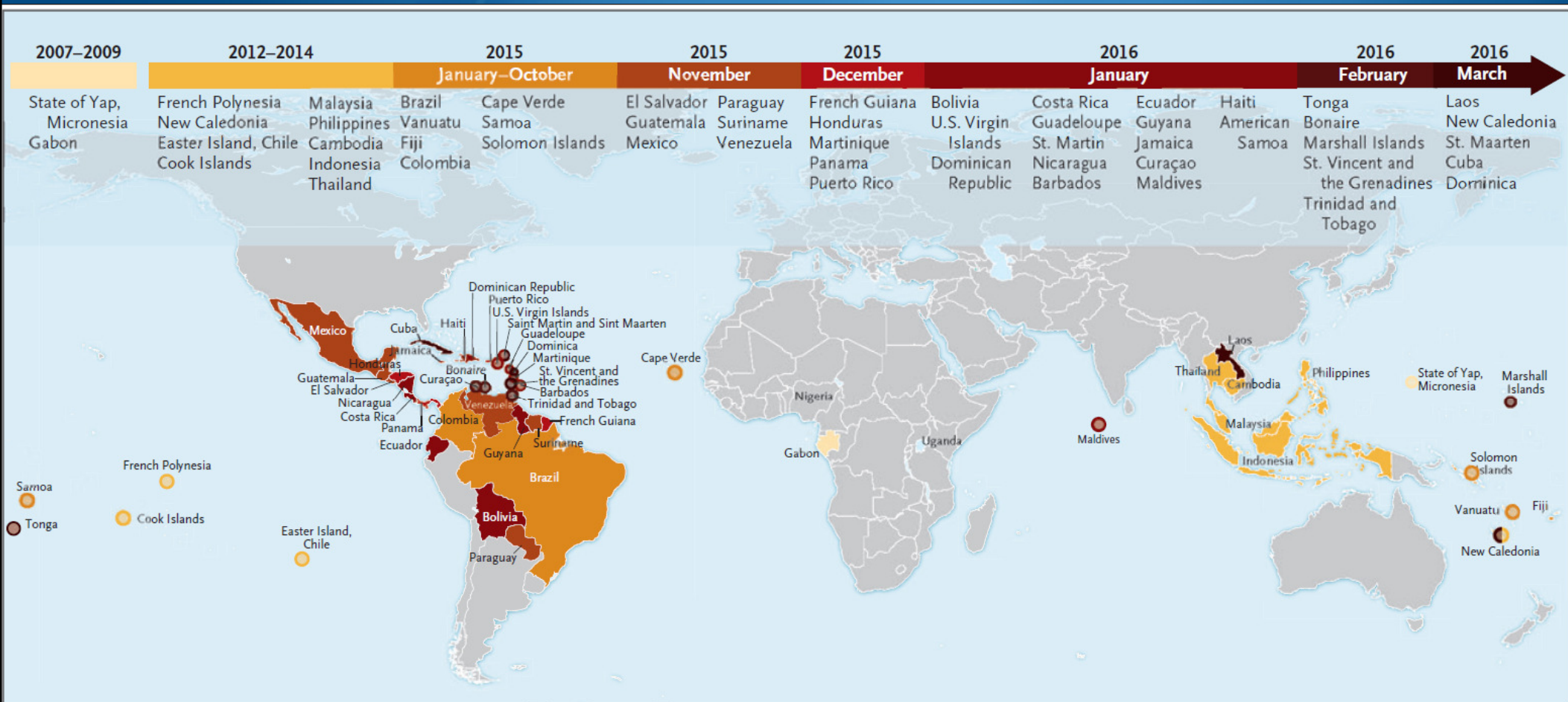


Figure 1. Areas in Which Zika Virus Infections in Humans Have Been Noted in the Past Decade (as of March 2016).

Only sporadic infections have occurred in Southeast Asia, the Philippines, and Indonesia.

Current Areas with Active Zika Transmission



Zika in the United States (as of 1/24/17)

- US States: 4,900 total cases
 - Travel-associated cases reported: **4,682**
 - 13 in New Hampshire
 - Locally-acquired vector-borne cases reported: **217**
 - Laboratory acquired: **1**
 - Sexually transmitted: 38
 - GBS: 13
- US Territories: 35,527 total cases
 - Travel-associated cases reported: **135**
 - Locally acquired cases reported: **35,392**
 - GBS: 51

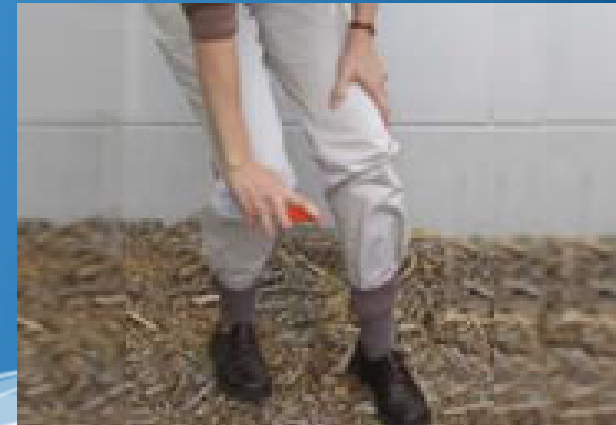
Prevention and Control Measures

Minimize Mosquito Bites

- Use EPA registered repellent
 - Minimize outdoor activity between dusk and dawn
 - Peak mosquito activity
 - Wear long sleeves, pants to deter bites
 - Keep screens in good repair--keep mosquitoes out of your home
- **Vitamin B, bug zappers, ultrasonic devices, incense, etc have NOT been proven to work**

Personal Protective Measures: Repellents

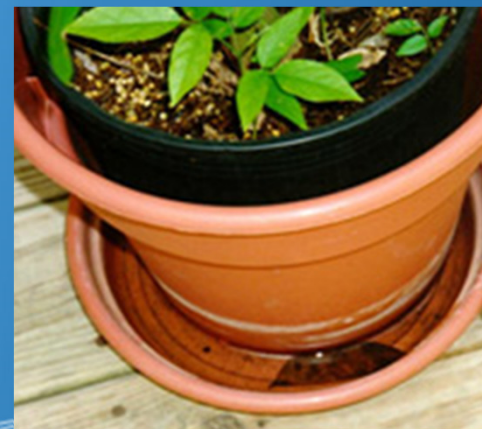
- DEET
- Oil of Lemon Eucalyptus
- Picaridin
- Permethrin
 - Applied to clothing
 - Permethrin impregnated clothing
 - Do not use directly on skin



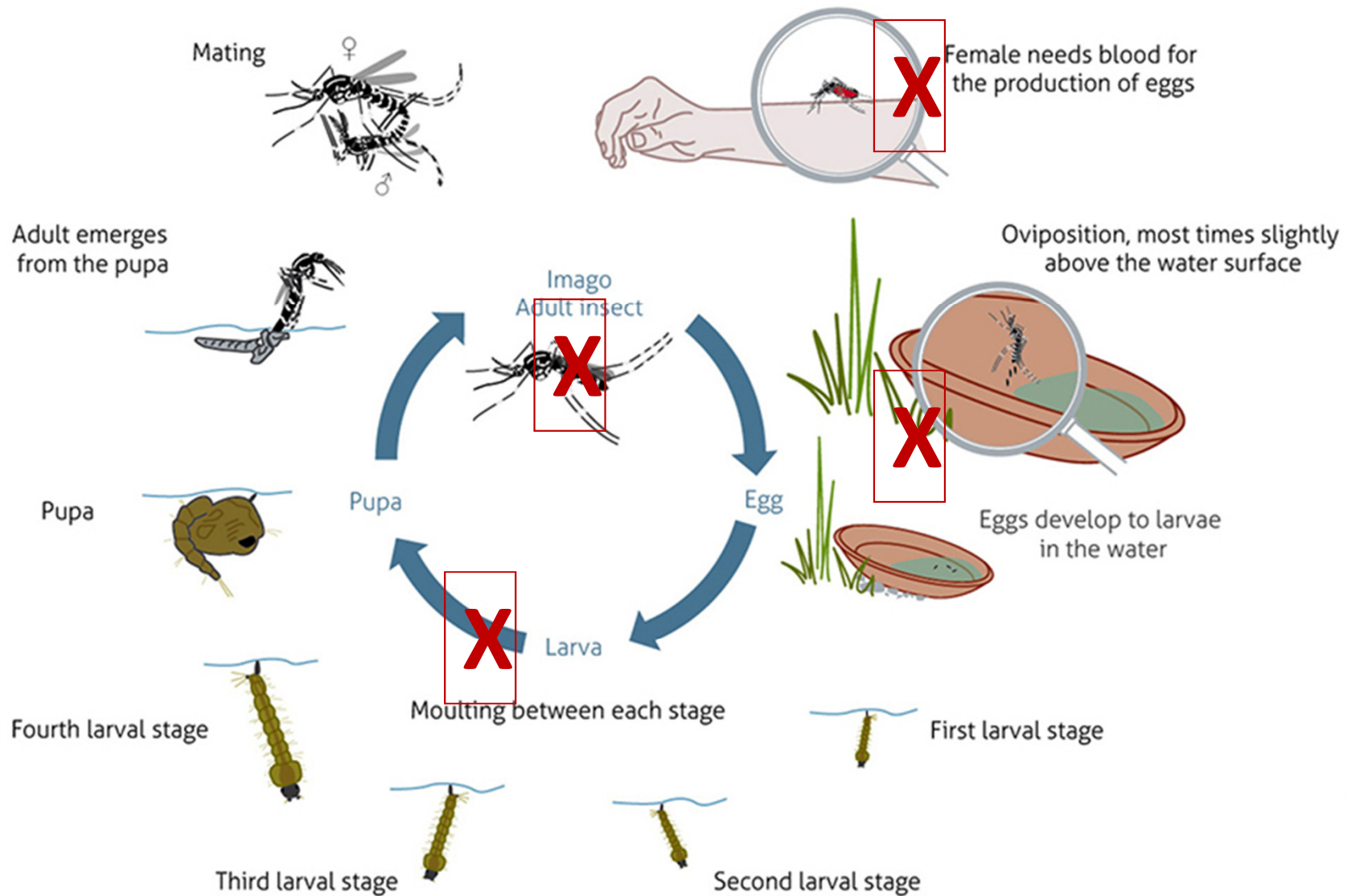
Mosquito-proofing

Don't give mosquitoes a place to breed!

- No standing, stagnant containers of water
- Treat standing water
- Dump small containers and put away if possible
- Turn over wheelbarrows, kiddie pools, portable containers
- Clean gutters
- Change water in bird-baths/fountains weekly
- Fold and store tarps
- **Drill holes in tires**



Opportunities for Control



www.biogents.com

© Biogents, I. Schleip



Public Health Services
Improving health, preventing disease, reducing costs for all
Department of Health & Human Services



Additional Information

- The CDC has more national surveillance information and disease specific information
 - www.cdc.gov
- The State of New Hampshire Arboviral Illness Surveillance, Prevention and Response Plan can be found here:
 - www.dhhs.nh.gov/dphs/cdcs/arboviral/documents/arboviralresponse.pdf
 - This document has additional information about arboviruses, vectors, and control
 - Updated annually

Acknowledgments

- NH DHHS Department of Public Health Services
 - Lisa Morris, Marcella Bobinsky, Benjamin Chan, Elizabeth Talbot, Elizabeth Daly, Carolyn Fredette, Tylor Young
- NH Public Health Laboratories
 - Christine Bean, Fengxiang Gao, Denise Bolton, Carol Loring, Amanda Cosser, Trevor Lester

Questions?

Follow us on Twitter
@NHIDWatch

"Like" us on Facebook
@NH Bureau of Infectious Disease Control

- **Contact information:**

NH Bureau of Infectious Disease Control
(603) 271-4496



GOOD AS GOLD



Grease to Gold: How to Make Energy From a Problem

Ray Gordon, NH Dept. of Environmental Services

Wastewater Engineering Bureau



Wastewater and Solid Waste = Perfect opportunity to work together

Why should you collect cooking oil!

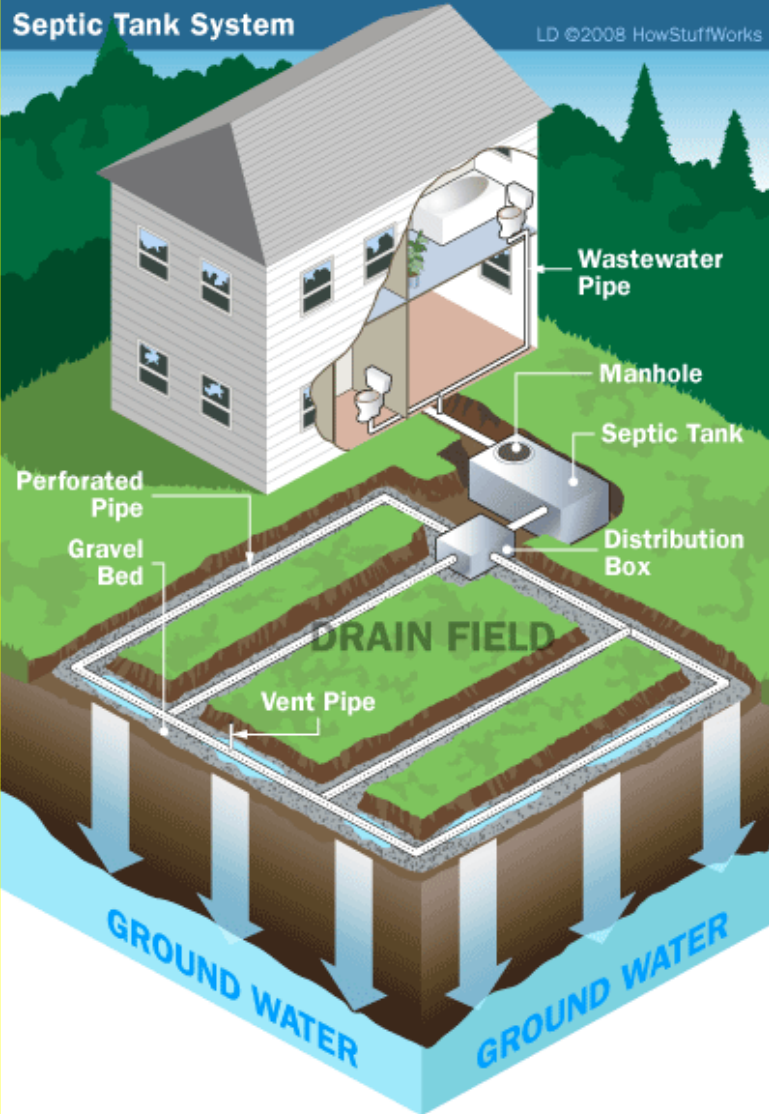
The Steps to Start a Collection!



Septic System vs. Wastewater Facility

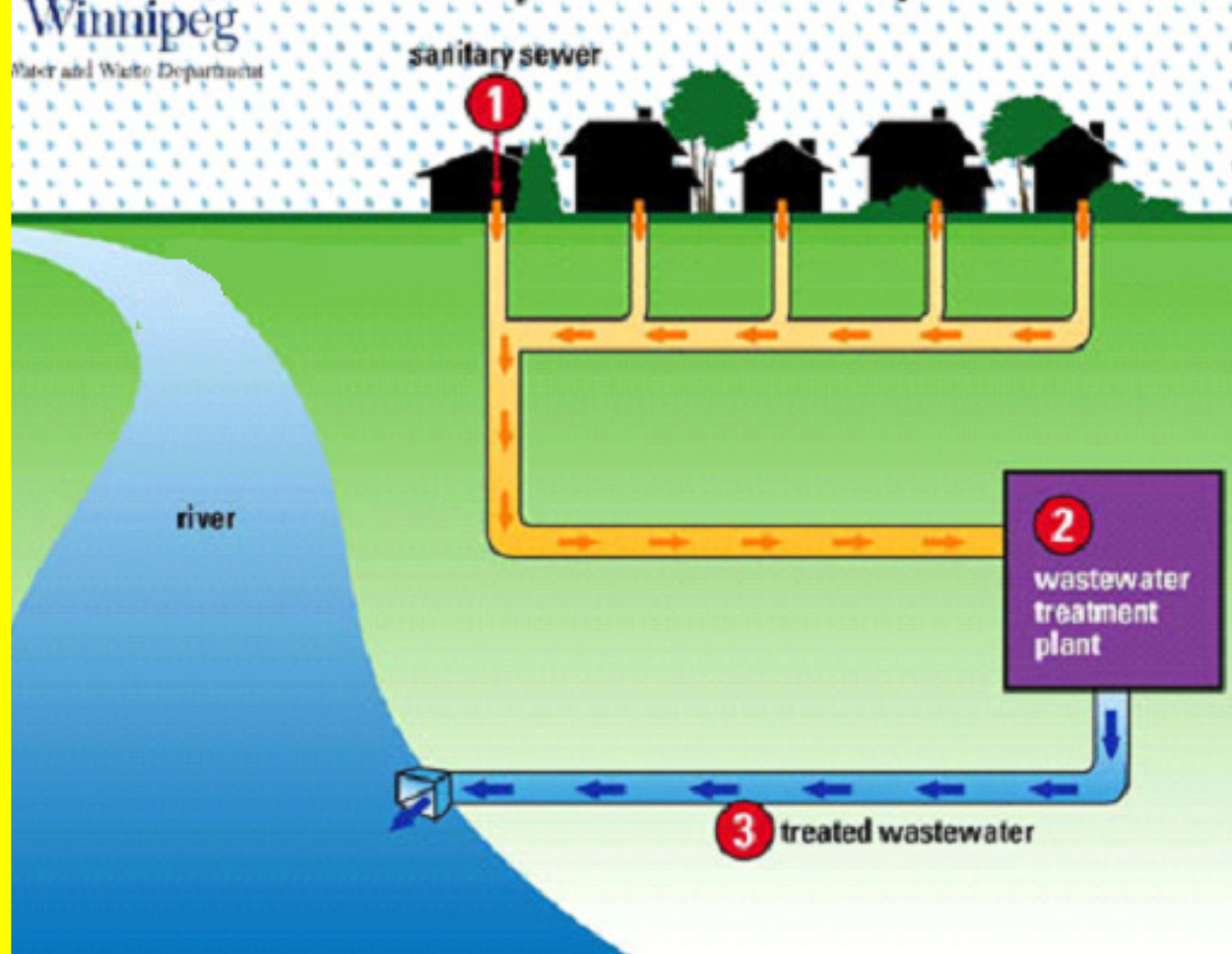
Septic Tank System

LD ©2008 HowStuffWorks



Winnipeg
Water and Waste Department

Separate Sewer System



FATS

Solid at room temperature

Butter, shortening, margarine
Peanut butter
Meat trimmings
Uncooked poultry skin
Dairy: Cheeses, milk, cream,
sour cream, Ice cream

OILS

Liquid at room temperature

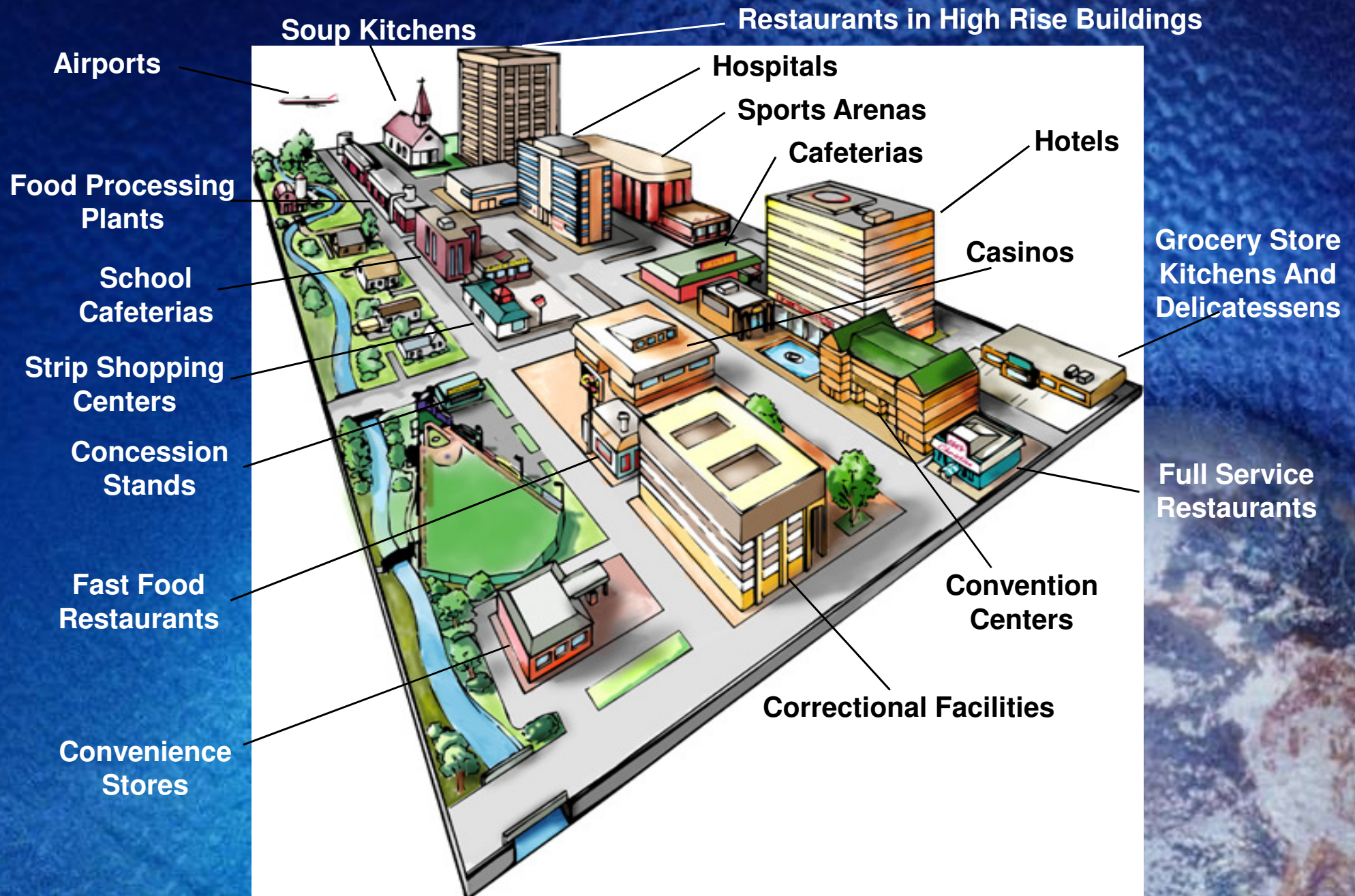
Vegetable oil
Canola oil
Olive oil
Corn oil
Salad dressings
Cooking oils

GREASE

Turns to liquid during cooking, but solidifies when cooled

Gravy
Mayonnaise
Melted meat fat
Bacon and sausage
Boiled poultry skin
Salad dressing

Sources of Fat, Oil and Grease



Fat, Oil and Grease

FOG Derived from food products such as:

- Deep-fried foods,
- Meats,
- Sauces,
- Gravies,
- Dressings,
- Baked goods,
- Cheeses, and
- Butter.



Basic Types of Waste Grease

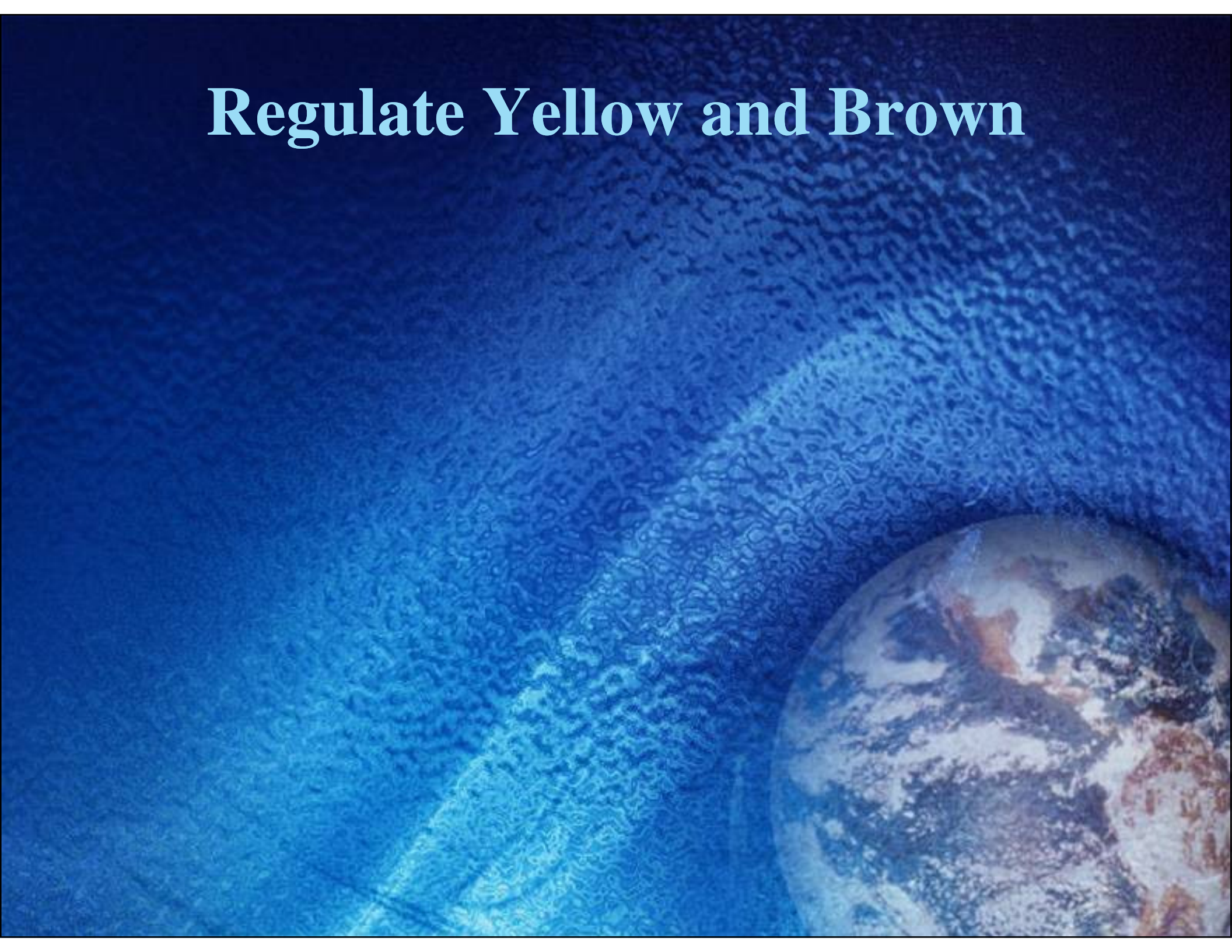


- Brown grease – mixed with wastewater, caught in interceptors or skimmed from the WWTF processes
- Regulated as Septage

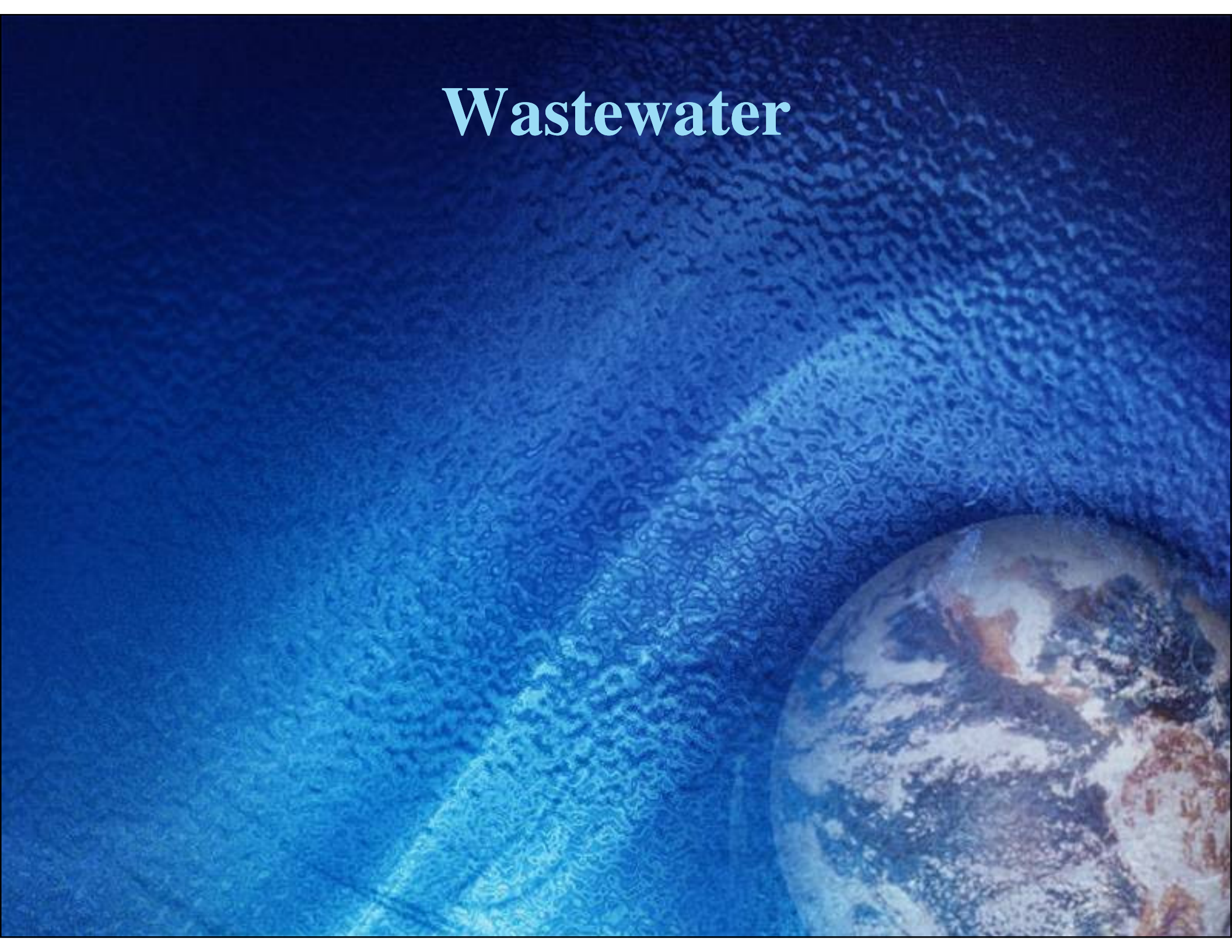


- Yellow grease – food grade (French fry) grease, no wastewater or waste contact, good for fuel
- Regulated as Solid Waste

Regulate Yellow and Brown



Wastewater



Which is more dangerous?





Houston, we have a problem

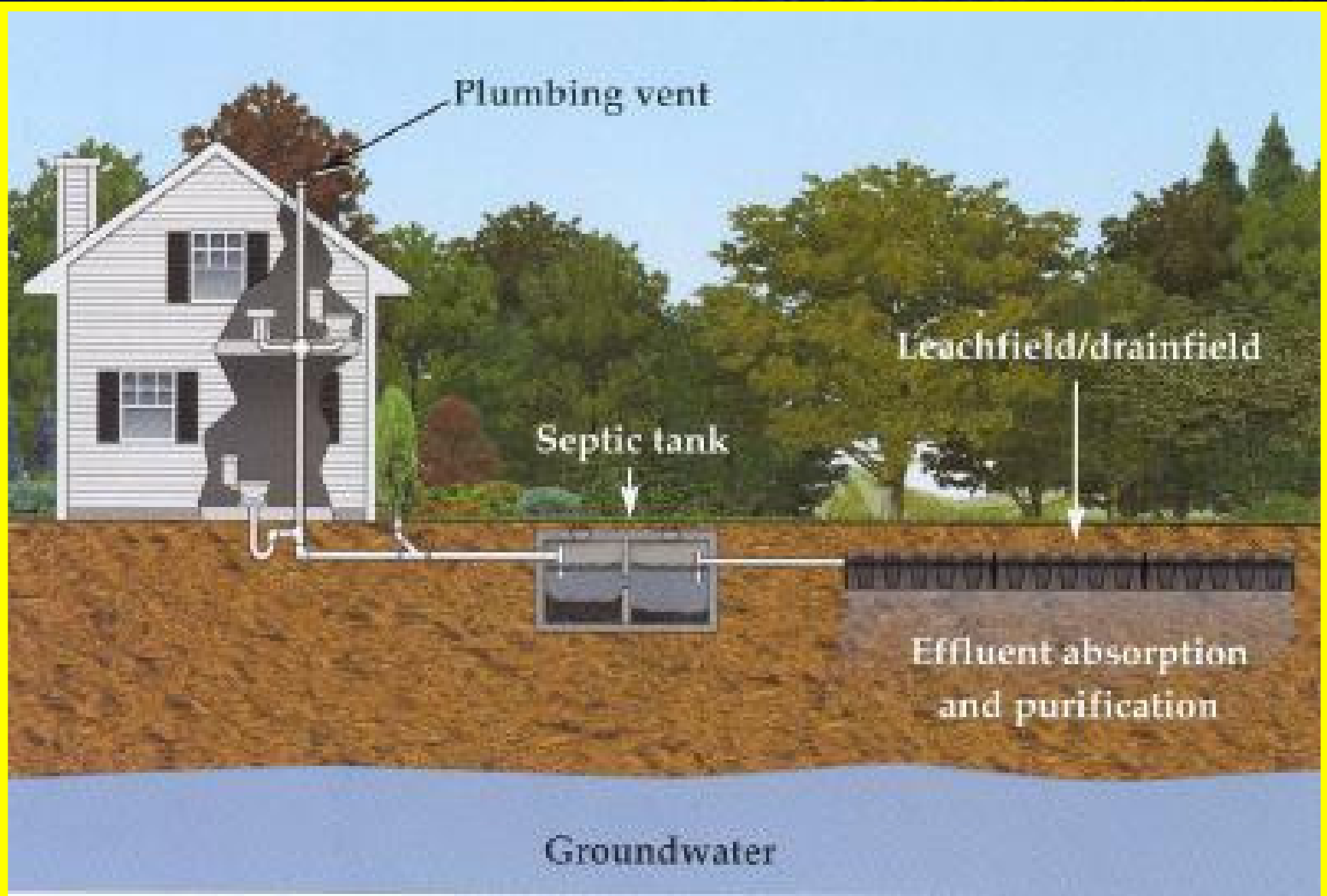
Show Someone Dumping Down the drain

- Yellow becomes
Brown grease
when put into a
drain



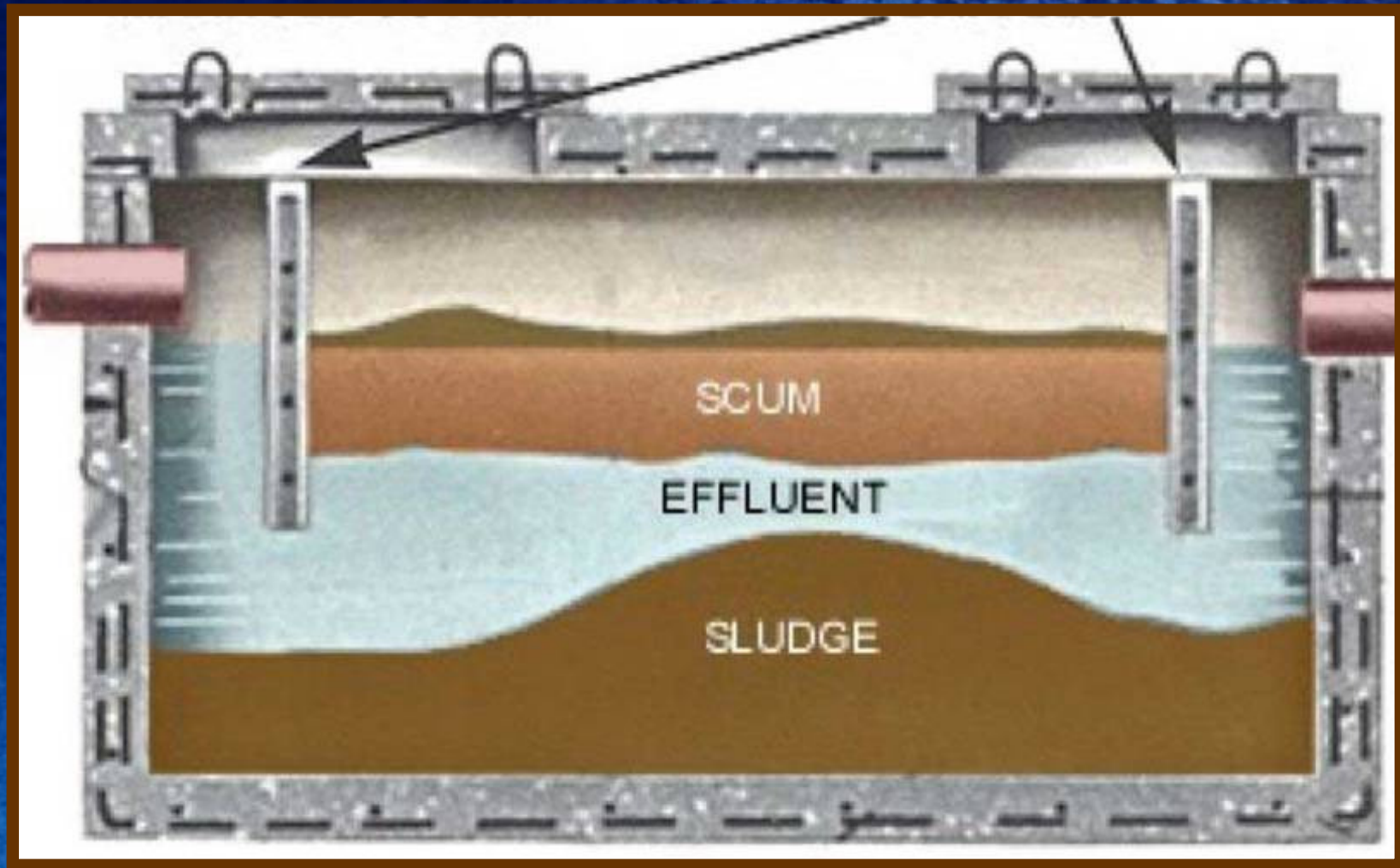
Septic Systems





Estimated 61% of NH Households on Septic Tanks

FOG in Septic Systems

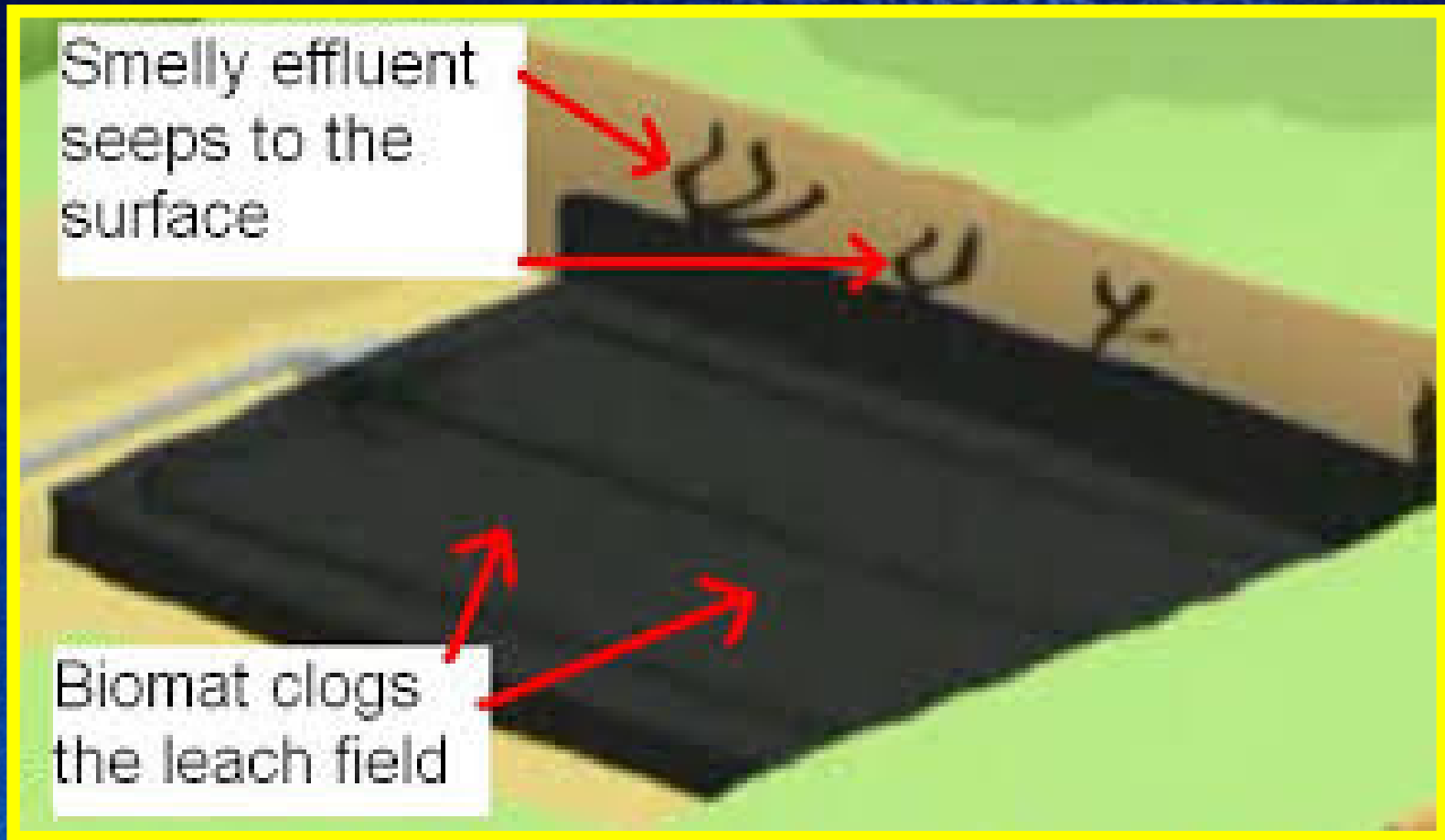


Fats can form a mass at the top of the septic tank and interfere with the biological activities taking place.

Septic Systems



The Problem?



Solids, grease, and smaller particulates that are allowed to leave the septic tank can buildup a bio-mat of viscous slime over the years. This can clog soil pores and render the leach field inoperable for percolation.

The Problem?



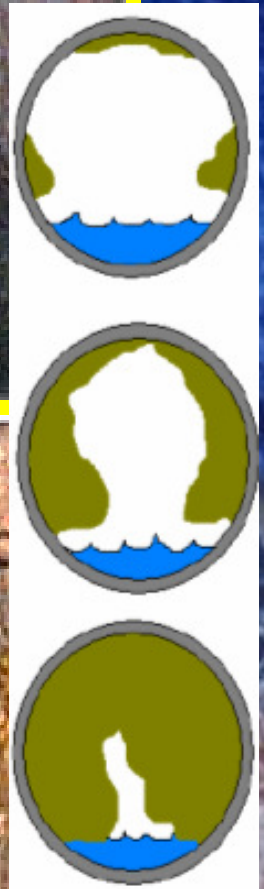
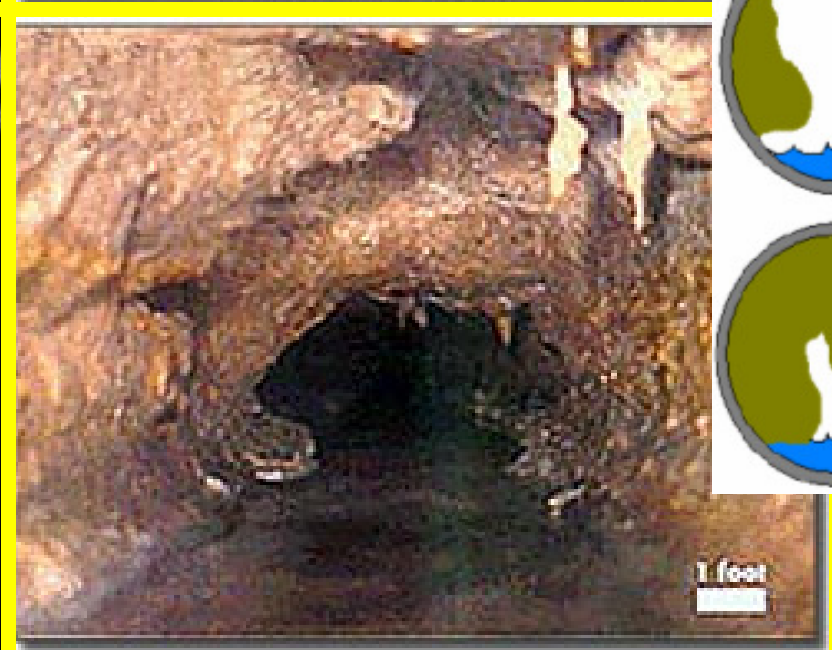
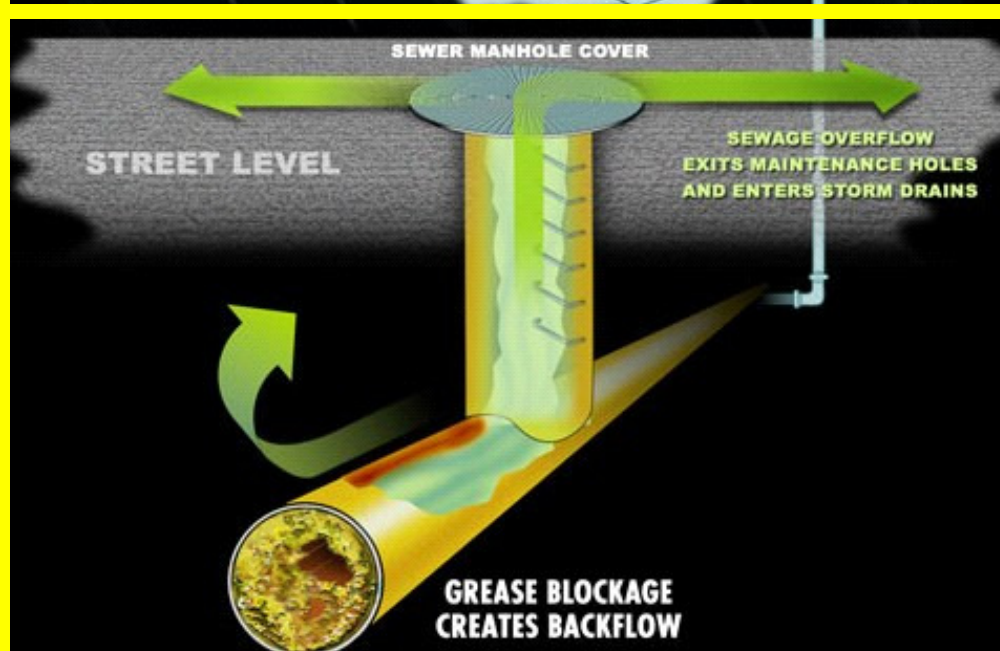
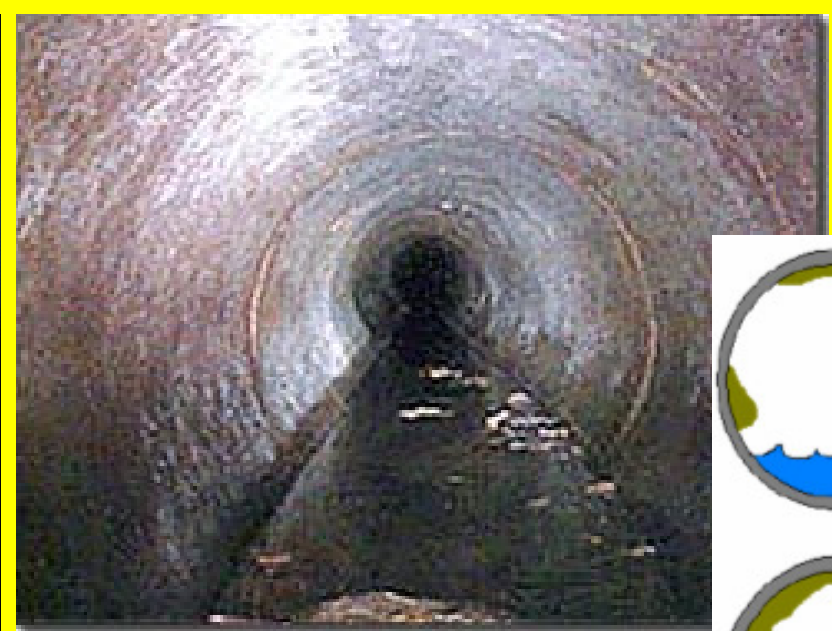
Wastewater Systems



Pass-Through



Interference



Sewer Overflows





A Serious Problem!!!!

- The problem is so serious it has made the front page of the Wall Street Journal!
- **WSJ** reported 75% of the nation's sewers work at half capacity because of grease clogs.
- \$25 billion per year problem for U.S. taxpayers.



Source: <http://www.rgf.com/grease101.htm>

If Communities Don't Prevent Overflows They Can Face Fines

EPA Files Lawsuits to Stop Sewage Overflows -- Environmental Biotech Offers Expertise to...

Publication: [Business Wire](#)

Date: [Wednesday, November 6 2002](#)

SARASOTA, Fla.--(BUSINESS WIRE)--Nov. 6, 2002

Grease clogged sewers are causing environmental damage and high costs for private business, government and the public. These clogged sewers can result in Sanitary Sewer Overflows (SSOs), which occur when raw, untreated sewage spills out onto streets, lawns and into public waterways. In fact, SSOs cause more water pollution than any other source.

lawsuits have been filed against

Atlanta, Baton Rouge, Cincinnati, Honolulu, Los Angeles, Mobile and San Diego, among others.

NH Communities Have Been Fined



United States Environmental Protection Agency

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News Releases By Date

Keene N.H. Fined for Violations at Wastewater Treatment Plant

Release Date: 04/18/2006

Contact Information: David Deegan, (617) 918-1017

(Boston, Mass. - Apr. 18, 2006) – The City of Keene, N.H. will pay a \$58,000 fine as part of an EPA settlement for violations of the federal Clean Water Act at the City's municipal wastewater treatment plant and sewer collection system. The violations resulted in sewage overflowing from the system on dozens of occasions.

The settlement resolves EPA concerns regarding Keene's wastewater treatment plant and sewer collection system. Keene's violations led to more than 30 overflows of untreated sanitary sewage between 2000 and 2005, many of which reached local waterways. Most of the overflows were caused by blockages in the system, which can be prevented by routine cleaning and maintenance.

"By ensuring that sewer lines are properly cleaned and kept free of grease, roots and other blockages, we can prevent overflows and help keep our rivers and streams clean and healthy," said Robert W. Varney, regional administrator of EPA's New England office. "EPA is committed to protecting people's health by enforcing environmental laws that protect our water, air and land."

Keene's public sewer system includes a secondary wastewater treatment facility that discharges 3.5 million gallons per day of treated wastewater into the Ashuelot River. The collection system is made up of about 86 miles of sewer, 2000 manholes, five city-owned pump stations and 10 privately-owned pump stations.

Other violations captured in the penalty issued by EPA today are for exceeding effluent limits for zinc in the city's National Pollution Discharge Elimination System (NPDES) permit, and the failure to develop appropriate local

April 18, 2006

\$58,000 fine as part of an EPA settlement

30 overflows of untreated sanitary sewage between 2000 and 2005

"By ensuring that sewer lines are properly cleaned and kept free of grease, roots and other blockages, we can prevent overflows and help keep our rivers and streams clean and healthy," said Robert W. Varney, regional administrator of EPA's New England office. "EPA is committed to protecting people's health by enforcing environmental laws that protect our water, air and land."

Which is more dangerous?





YOU can help

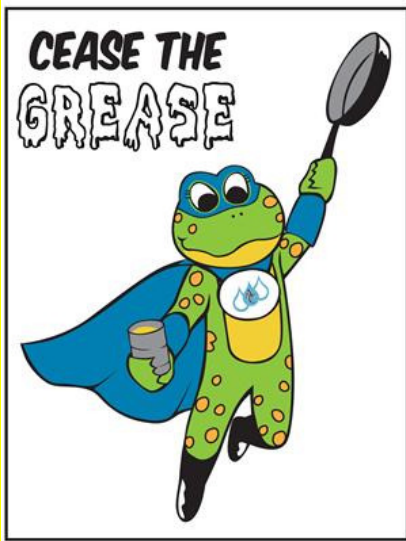
Partnership



Protect homes



Set up a simple Recycling program!



North Oconee (GA) Water Reclamation Facility.



Northeast Resource
Recovery Association



NRRA Waste Vegetable Oil Collection Program

Provides **YOU** a Simple
Waste Vegetable Oil
Collection Solution

The photograph shows two large blue metal drums (totes) in the foreground, both labeled with the 'AMENICO' logo and 'American Energy Independence Company, LLC'. The drums are standing on a gravel surface. In the background, there is a wooden structure with several signs. One sign lists various electronic waste items like 'Thermometers', 'Fluorescent Light Bulbs', 'Thermistors', 'Flat Panel Display Screens', and 'Button Cell Batteries'. Another sign is for 'The Paint Exchange LLC'. A green sign with a recycling symbol and the word 'RECYCLE' is also visible. To the right, a large white tank is partially visible, with signs that read 'USED OIL' and 'DANGEROUS WASTE WASTE OIL'. The overall scene appears to be a waste management or recycling facility.

Step #2 -Free Signs

NH The Beautiful

- Each town gets 60 points a year towards free signs
- This sign is 14 points



Step #3 – Educate the Public



Pollution Prevention



Brown Grease –
A Problem
Costs you \$\$\$

Convert

Yellow Grease –
A Resource
Can Pay you \$\$\$

- Turkey Fryer

Lots of grease

- After

- Photos of homes deep frying – Deep fried

- Bmp – Wipe pots and pans

- FATS and Grease Still Solid Waste

Lid – Freeze

- Scrapers





**Recycling
used oil is
completely
logical.**

Acceptable Cooking Oil Products

- Canola
- Soy
- Palm
- Olive
- Corn
- Peanut
- Cotton seed
- Sunflower
- Vegetable
(Combination)

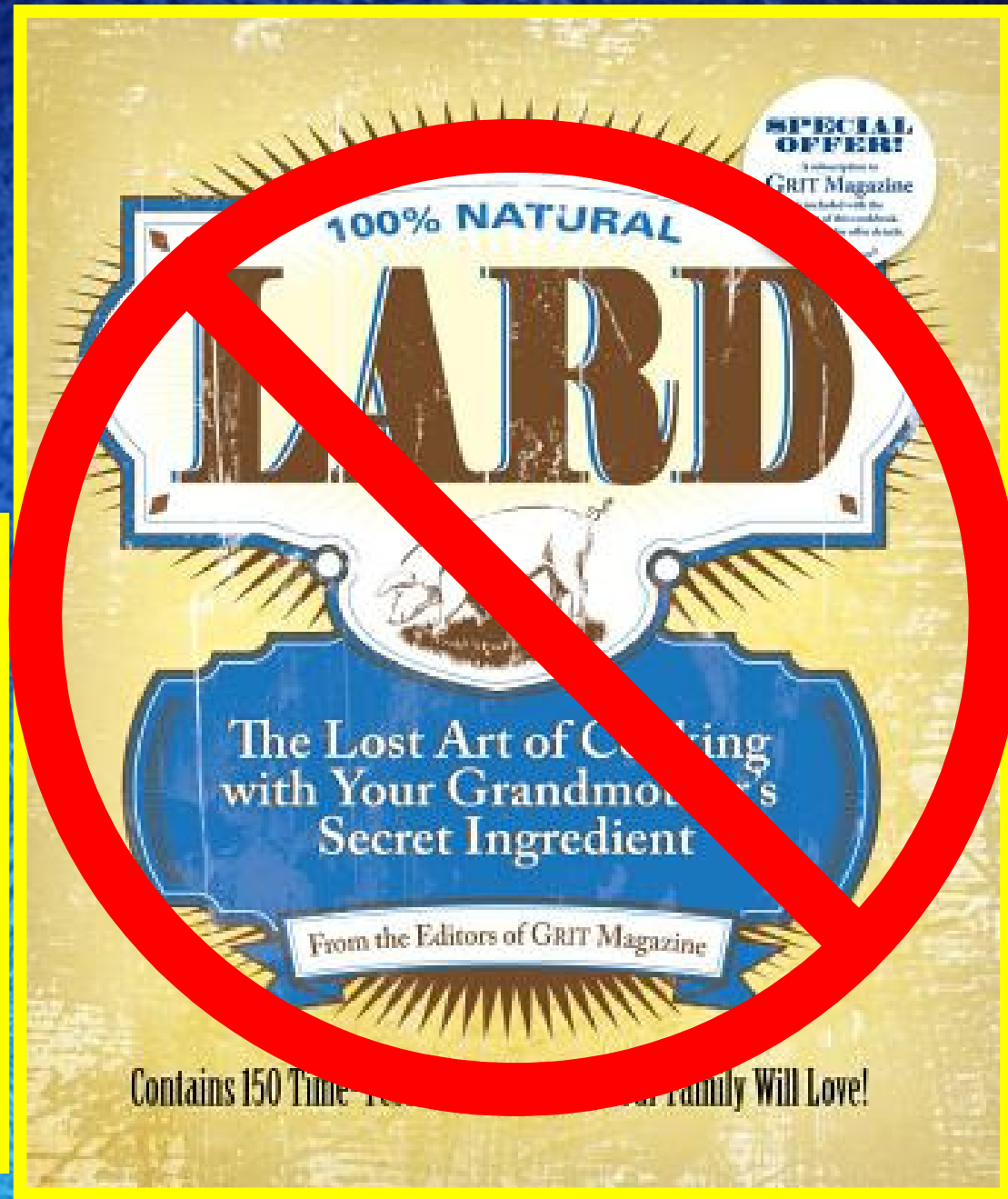


Must be in a liquid state



Unacceptable Cooking Oil Products

- LARD - pig fat in both its rendered and un-rendered forms



Unacceptable Oil Products

- Any other oil “not Cooking oil”
 - Linseed oil
 - Motor oil





**ONLY YOU
CAN SAVE
OUR SEWERS**



***My Spidey
Sense tells
me to
recycle
used
cooking
oil!***

For more information
call 251-626-2628 or visit us at
www.daphneutilities.com

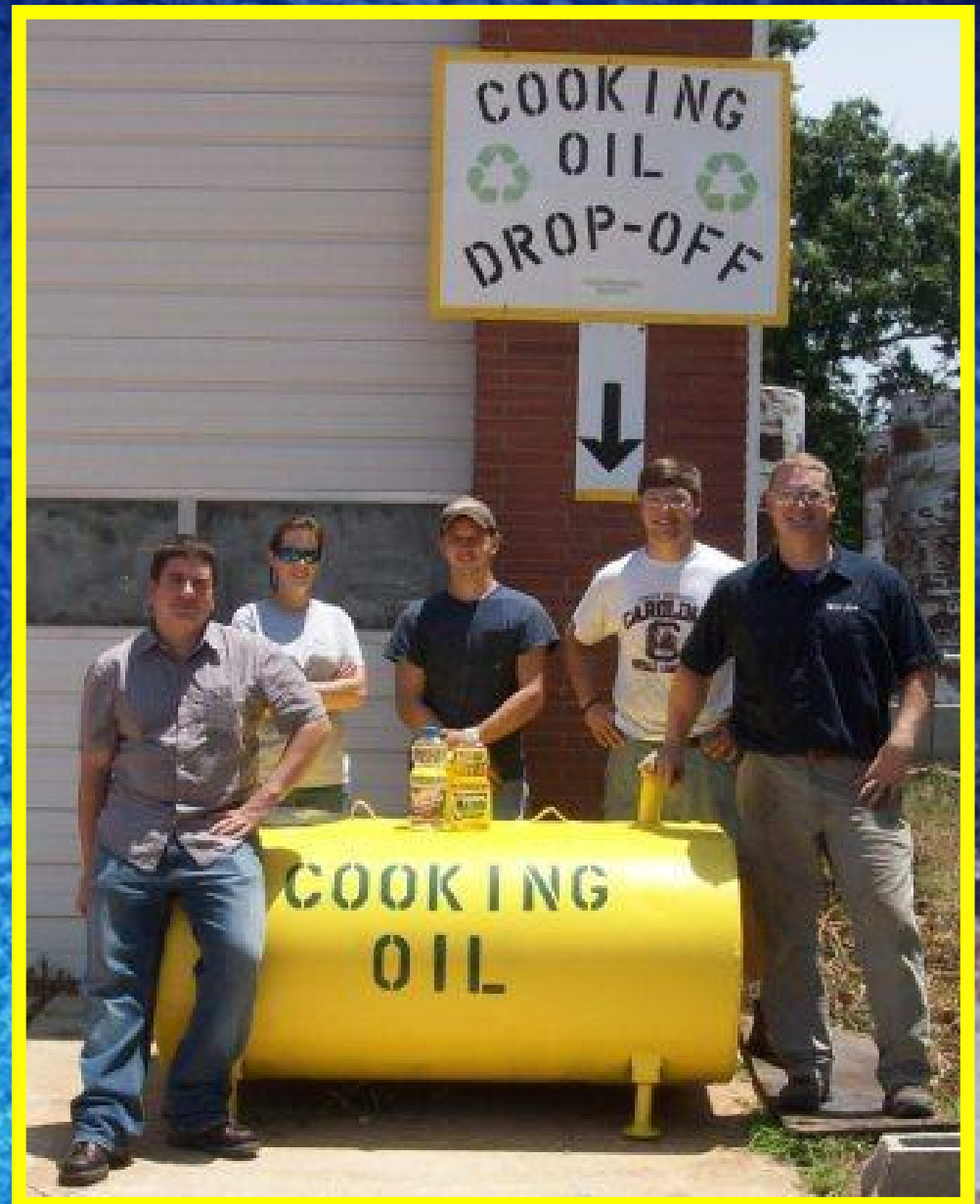
***Recycle
Used Oil
You Will,
Young
Jedi!***



Daphne Utilities



Step #4 –Start Collecting













Step #5 - Free Pick-Up



Geographic Coverage

Collection Area:

NH

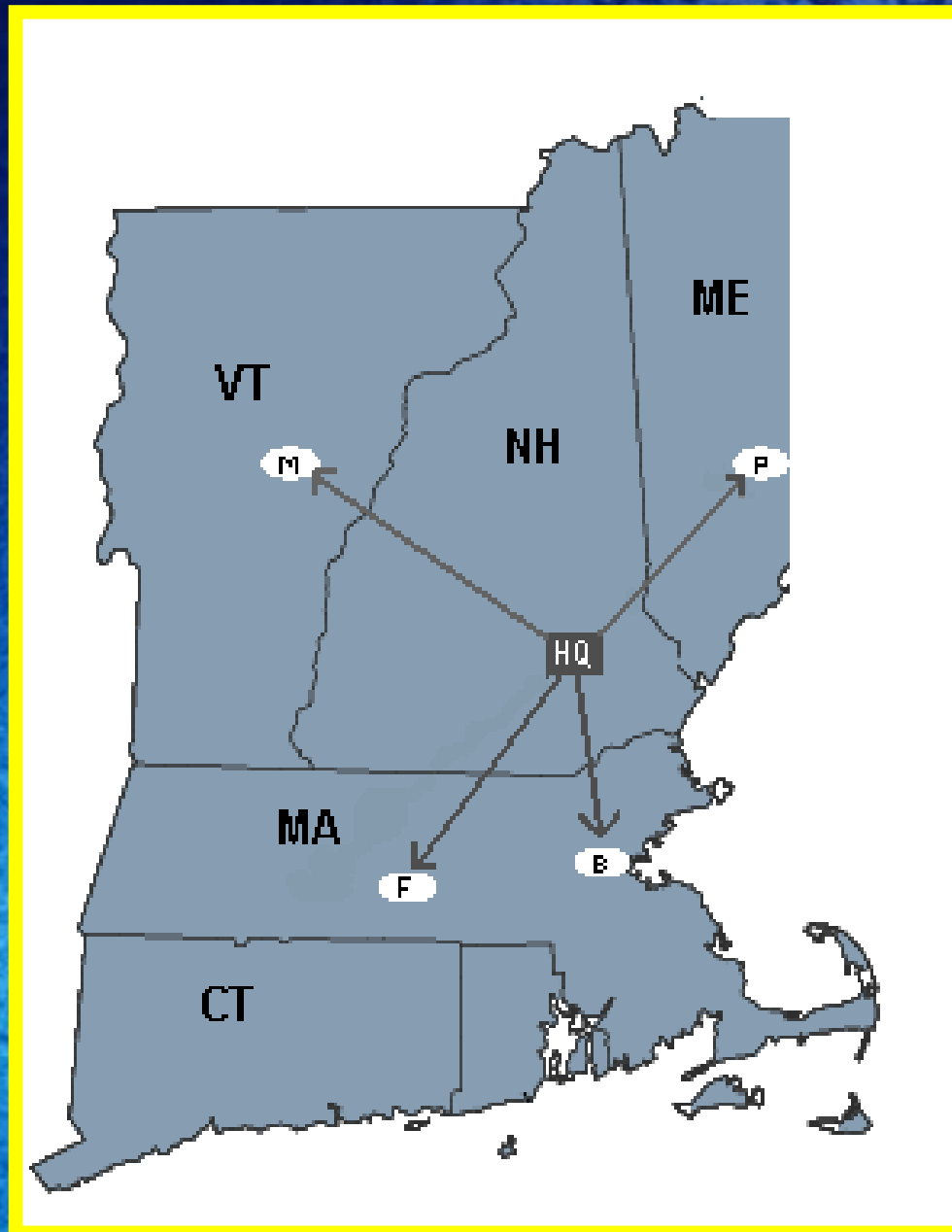
MA

RI

ME

VT

CT



Strategic Locations:

**Pittsfield NH
Headquarters**

Fitchburg Hub

Boston Hub

Portland Hub

Montpelier Hub

Pittsfield Facility



What AMENICO Does!!!



Turned Raw Waste Cooking Oil...

...into a vegetable based biofuel



7,302 gallons in 2016

Step #6 – Collect Revenue



- High of \$1.15/Gallon
- \$0.35/gallon in 2016

Theft Has Been A Problem



Grease Theft in Action



Even Homer Simpson Tried to Get Rich Collecting Grease



Step #7 – Brag about the Benefits

- Recycled used vegetable oil is being used for energy recovery and is not being wasted in our landfills or disrupting wastewater treatment plants.
- Reused as a fuel, vegetable oil has fewer harmful air emissions.
- Reduce our nation's dependence on natural resources.

Will you help?

- Provide residents a solution
- Contact **NRRA TODAY!!!**

Phone: 603-736-4401

1-800-223-0150

Fax: 603-736-4402

Web Site: www.nrra.net

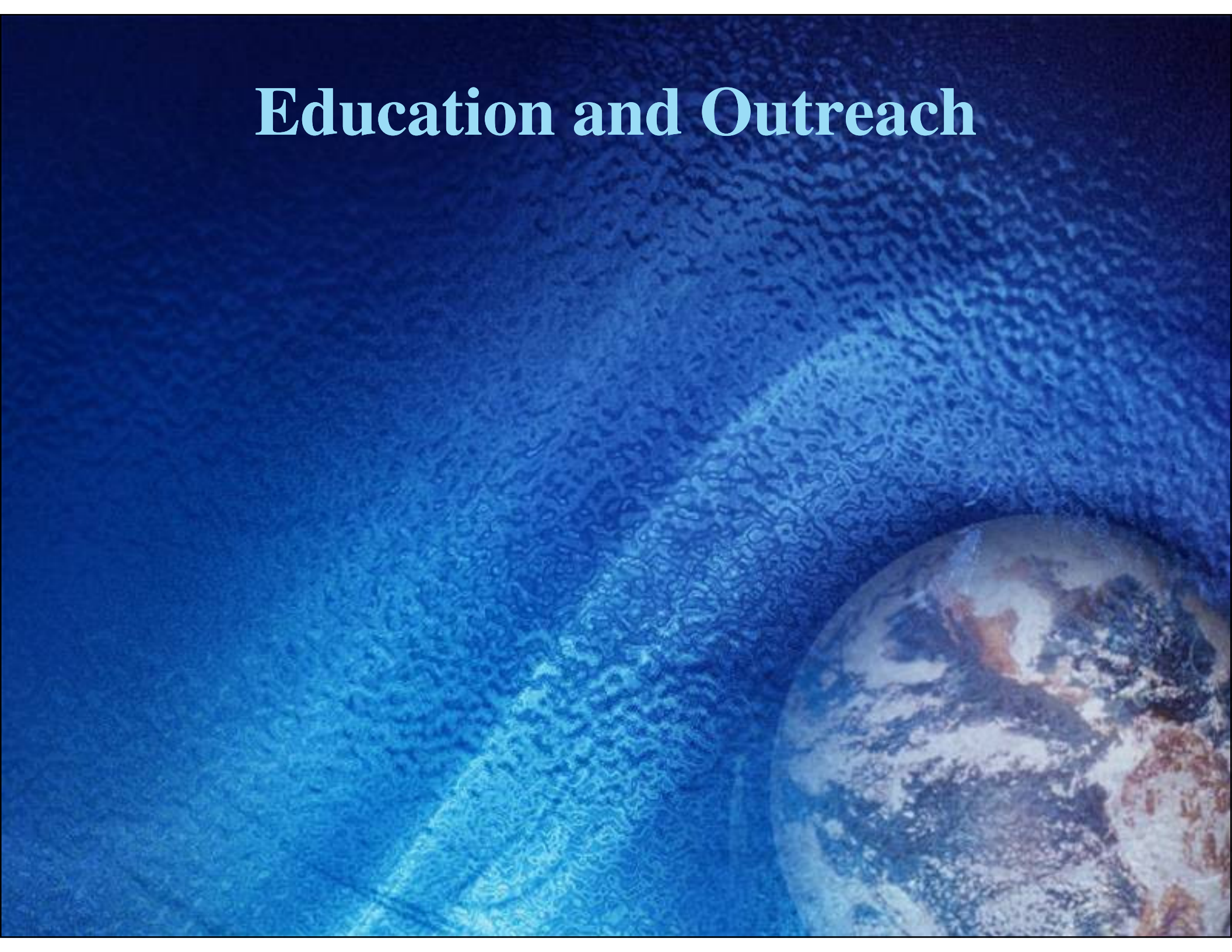
Office Email: info@nrra.net



41 Towns Participated in 2016

Let your Sewer Department know so they get credit as part of their FOG Program

Education and Outreach



Contact Info

Ray Gordon
DES Septage Coordinator
(603) 271-3571

**Grease
Recycling**



Together We Can Make A Difference